BUREAU OF HYGIENE
21 OCT 1929
& TROPICAL DISEA.

Municipality of Singapore

HEALTH DEPARTMENT

ANNUAL REPORT
for
1928

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BUREAU
21 OCT 1929
& TROPICAL

MUNICIPAL HEALTH OFFICE.

Singapore, 29th April, 1929.

To
THE PRESIDENT,
MUNICIPAL COMMISSIONERS,
SINGAPORE.

SIR,

I have the honour to report as follows for the year 1928.

I. ZYMOTIC DISEASE.

There were 1,520 cases notified compared with 1,294 in 1927 and with 1,165 in 1926.

The following table shows the comparison between this year and the previous ten years:—

Year	Enteric Fever	Diphtheria	Chicken-pox	Puerperal Fever	Erysipelas	C. Spinal Fever	Paratyphoid Fever	Small Pox	Plague	Cholera	Typhus Fever	Scarlet Fever	Tuberculosis	Total
1918 ..	287	31	107	8	4	5	2	11	176	—	—	—	104	735
1919 ..	174	42	34	14	3	22	3	14	11	75	—	—	866	1,258
1920 ..	129	33	68	15	1	29	2	4	61	33	—	—	520	895
1921 ..	127	49	119	13	11	70	4	150	28	1	—	—	319	891
1922 ..	68	52	127	16	7	32	2	268	39	1	—	—	169	781
1923 ..	63	37	188	12	14	9	1	3	52	—	—	—	409	788
1924 ..	64	38	230	22	9	16	—	9	20	11	—	—	331	750
1925 ..	136	51	31	14	2	10	2	10	59	1	—	—	365	962
1926 ..	197	46	169	25	14	6	1	34	7	22	1	1	642	1,165
1927 ..	235	29	193	22	5	17	7	19	4	30	—	—	733	1,294
Average for 10 years ..	148.0	40.8	126.6	16.1	7.0	21.6	2.4	52.2	45.7	17.4	—	—	445.8	951.9
1928 ..	230	59	350	11	8	15	12	9	5	9	1	3	808	1,520

The following table shows the incidence by nationalities:—

	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
Enteric Fever ..	7	6	191	3	20	3	230
Diphtheria ..	10	9	29	3	4	4	59
Chicken-pox ..	2	24	64	11	245	4	350
Puerperal Fever ..	—	—	7	2	2	—	11
Erysipelas ..	—	—	7	—	1	—	8
C. Spinal Fever ..	—	—	4	—	11	—	15
Paratyphoid Fever	1	—	8	—	2	1	12
Small Pox ..	1	—	2	4	2	—	9
Plague ..	—	—	2	—	3	—	5
Cholera ..	—	1	5	1	2	—	9
Typhus Fever ..	1	—	—	—	—	—	1
Scarlet Fever ..	3	—	—	—	—	—	3
Tuberculosis ..	6	13	596	50	126	17	808
Total ..	31	53	915	74	418	29	1,520

The following return shows the number of notifiable diseases for each month of the year:—

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Enteric Fever ..	21	12	28	16	22	30	12	22	19	24	13	11	230
Diphtheria ..	5	4	5	5	6	4	5	11	2	9	2	1	59
Chicken-pox ..	32	31	20	14	25	28	36	16	25	19	50	54	350
Puerperal Fever ..	2	2	—	2	1	1	1	1	—	—	1	—	11
Erysipelas ..	2	—	—	2	1	—	2	—	—	1	—	—	8
C. Spinal Fever ..	1	2	—	—	3	2	4	1	1	—	—	1	15
Paratyphoid Fever	2	—	7	—	—	—	—	1	—	1	—	1	12
Small Pox ..	1	1	1	3	—	1	—	—	1	1	—	—	9
Plague ..	—	3	2	—	—	—	—	—	—	—	—	—	5
Cholera ..	6	1	1	1	—	—	—	—	—	—	—	—	9
Typhus Fever ..	—	1	—	—	—	—	—	—	—	—	—	—	1
Scarlet Fever ..	—	—	—	—	—	1	—	—	—	2	—	—	3
Tuberculosis ..	52	60	64	71	65	75	72	76	69	65	59	80	808
Total ..	124	117	128	114	123	142	132	128	117	122	125	148	1,520

SMALL POX.

There were 9 cases in all, 1 European, 2 Chinese, 2 Indian and 4 Malay. 1 was found dead, 1 died in hospital while 7 recovered.

The European, an engineer on a ship, contracted the disease in Hongkong. One Malay was found in a Hadji lodging house. He had been 6 days in the colony, while the other Malay was 12 days from Trengganu. One Indian was 2 days from Negapatam, while other 2 cases came from outside municipal limits.

PLAGUE.

There were 5 cases in all, 3 Indian and 2 Chinese. 2 were found dead, 2 died in hospital and 1 recovered. The history of 4 of the cases is interesting. On 10/2/28 one case occurred in 182 Cross Street, on 14/2/28 a second occurred in 87 South Bridge Road, the third in 176 Cross Street on 24/2/28 and the fourth in 71 South Bridge Road on 6/3/28. On 15/2/28 a live Decumanus was caught in 174 Cross Street —plague infected. On 17/2/28 another plague infected Decumanus was caught alive in 4 Ramah Street. Houses 182, 176 and 174 Cross Street and 71 South Bridge Road and 4 Ramah Street are all in the corner of one block, and back on to each other while 87 South Bridge Road is only a few doors away. It is quite obvious therefore that these cases were all connected and were preceded and accompanied by a small outbreak of rat plague. In all probability this was not imported but was simply a flare up of the indigenous epizootic—though it is always possible of course that an infected flea or rat was imported. Extensive trapping was kept up in this block but no further signs of active rat plague were found.

The remaining case was found dead in Cuppage Road. He was found to have come from Colombo Court but no further information could be obtained.

During the year 398 rats were examined by the Bacteriologist. Only the two already mentioned were found infected. No systematic trapping was carried out during the year, dependence being chiefly placed on the Town Cleansing department whose coolies had instruction to bring to the laboratory all dead rats found by them during the course of their work.

CHOLERA.

There were 9 cases in all, 1 Eurasian, 5 Chinese, 2 Indian and 1 Malay. 5 were found dead, 3 died in hospital and 1, the Malay, recovered.

1 Chinese on 2/1/28, and 1 Eurasian on 8/1/28 were from the Lunatic Asylum, and no doubt received their infection there, and were connected with the small Asylum outbreak at the end of December 1927.

A Chinese boatman was found dead in 96 Amoy Street on 2/1/28, another was found dead in Boat Quay on the same day, a third was found dead in an old boat lying off Raffles Reclamation on 5/1/28, while on 8/1/28 another .twakow boatman was found in Boat Quay and removed to hospital. It is extremely likely that all these cases were connected and most probably came down from China together on an ocean going junk.

On 10/1/28 an Indian ship coolie was found dead at 83 Wallich Street. He may or may not have been connected with the last cases.

Of the other two cases one was found in 33 Lavender Street and one in 124 Bencoolen Street but the occupants of these premises denied any knowledge of them.

ENTERIC.

230 cases were notified during the year as against 235 in 1927. But 137 deaths were recorded as due to this cause; in other words there must have been far more than 230 cases, most probably at least five times that number.

An effort was made to follow up many of the cases but, with few exceptions, very little connection could be made out between individual cases and the source of infection could only be guessed at.

The cases were evenly spaced throughout the year and at no time was there any sign of an epidemic. Toward the end of the year simply because one or two Europeans happened to contract the disease, there was somewhat of a popular outcry, but there was never any justification for it. In connection with this I may say there were only 7 European cases altogether, but to my mind there need not be even that small number if they would scrupulously observe one or two very elementary rules of hygiene, the chief of which is never to eat any green vegetables of which one does not know the source. How any educated persons of European or other race for that matter, can eat from the filthy street hawker stalls, as one knows they do, has always been a puzzle to me.

To return, the cases were evenly distributed throughout the year—never during any month was the number of cases unusual so that, as in former years, we can safely rule out any common source of infection such as the water or milk supply. All cases must have been contracted from a previous acute case or a " carrier."

My views on the hawker question are well known and I need not repeat them. But I ask once again how long do we intend to allow food to be prepared in filthy hovels and hawked under the most abominable conditions indiscriminately on our streets. I unhesitatingly say that most of our cases of Enteric must be due to the lax way in which cooked food is handled from its preparation to the consumer. All the evidence points to this. If we had flies in this town, to make the transference so much easier, I tremble to think what would happen. It should not be forgotten that the above applies equally well to Dysentery which is credited in the annual returns with causing 482 deaths. The fatality rate in this disease is not very high, especially in Amoebic Dysentery, and 482 deaths must mean many thousands of attacks. Truly our slack way of handling food supplies is responsible for much and would not be tolerated elsewhere. When one knows that in America for instance, one or two cases of typhoid in Chicago, may lead to the closing down for a whole season of the oyster beds on the coast, one realises what a long way we have still to go in the elementary principles even of Preventive Medicine.

TUBERCULOSIS.

808 cases were notified but 1,411 deaths were recorded, so that little imagination is required to visualise the many thousands of acute cases there must be at any given period. 1,523 deaths were recorded last year so we have to our doubtful credit that the number is a little less.

CEREBRO SPINAL FEVER.

There were 15 cases. A point of interest in these is that 4 of them came from our own coolie lines at Elgin Bridge. There were quite wide intervals between the cases and on each occasion the lines were thoroughly disinfected. An effort was made to find the obvious "carrier" but he could not be located.

DIPHTHERIA.

In this connection I would draw attention to the Bacteriologist's remarks under this heading in his annual report. He says with regard to this disease that " education as to its danger is needed." There is more of this disease than one would imagine but luckily for us the conditions for its easy transference are not found in Singapore. That it can spread, however, when the conditions are favourable, was shown in the case of a school where of 79 pupils examined 5 were proved to be active "carriers."

There is a tendency on the part of parents to take the disease lightly and a more regrettable tendency on the part of certain medical men both to delay in taking a swab and sending it for examination, and having sent it to wait for confirmation even when the clinical signs suggest diphtheria.

SCARLET FEVER.

There were 3 cases of this disease, all Europeans, and all removed from ships.

CHICKEN-POX.

Of the 350 cases 245 were Indian adult coolies. There is no way of accounting for this except that most probably in their isolated Indian Villages they escaped an attack during early childhood. The fact remains that they are unusually susceptible to the disease.

GENERAL.

(1) Medical Inspection of Passengers.

191 permits to land were granted to 262 passengers 41 of whom failed to report for inspection. There is a growing tendency, especially on the part of Europeans, who have signed undertakings, to neglect to report. People are apt to forget this permission to land is more or less a privilege, and one or two prosecutions might bring them to their senses.

(2) Disinfection of Infected Articles.

2,321 articles were disinfected. The steam disinfector was used on 14 occasions while the portable sack disinfector was used on 10 occasions. This last has proved extremely useful especially in cases of dangerous infectious disease.

(3) Houses Quarantined and Disinfected.

18 houses were quarantined, all being released by the end of the year. 917 houses (Phthisis cases 553) were disinfected. Two attap huts of an approximate value of $50/– were burned.

(4) Infected Persons and Contacts.

438 patients were removed to hospital, 8 bodies removed for autopsy, 44 bodies buried under supervision and 115 contacts were sent to St. Johns Island for quarantine.

II. MIDDLETON HOSPITAL.

At the end of 1927 there were 30 patients remaining in hospital while during 1928 there were 670 admissions making a total treated of 700. Of these 633 were discharged, 37 died while 30 remained in hospital at the end of the year.

324 of the admissions, almost half the total, were cases of Chicken-pox.

The report of Dr. Gilmour the Medical Superintendent is appended.

III. VACCINATION.

The following vaccinations were reported:—

	Successful	Modified	Failed	Not seen	Total
Medicalmen ..	1,630	—	2	7	1,639
Private Vaccinators ..	1,939	2	7	9	1,957
Municipal Vaccinators ..	6,854	27	45	190	7,116
Total ..	10,423	29	54	206	10,712

Of the total number of 7,116 vaccinations performed by the Municipal Vaccinators 6,854 or 96.3 per cent were successful 45 were unsuccessful, 27 were modified and 190 remained to be seen a second time.

The nationalities of those vaccinated by Municipal Vaccinators were:— Europeans 11, Eurasians 55, Chinese 5,906, Malays 712, Indians 361, Others 71. Of these 3,629 were males and 3,487 females of the following ages:—

Uuder 1 years of age	5,871
Between 1 and 2 years	452
„ 2 „ 5 „	375
„ 5 „ 10 „	184
„ 10 „ 20 „	19
Unknown	215
	7,116

At the municipal vaccination stations there were performed 4,352 vaccinations, at Police Stations 1,840, at houses 687, at Child Welfare clinics 185 and of contacts 52.

2,303 tubes of lymph were used by the Municipal Vaccinators, being equivalent to an average of 3.1 persons per tube.

The Municipal Vaccinators vaccinated 5,871 infants but as there were 15,540 infants born during the year it is obvious that quite a few were missed. Last year I had occasion to say that I was not satisfied with the vaccinated state and that steps would be taken to improve it and consequently I am a little disappointed with the figures. It is quite likely that many vaccinations have not been reported as medical practitioners and Private Vaccinators are somewhat lax in sending in proper returns. Nevertheless I am satisfied that many parents are evading their responsibilities. It may be that, now it is no longer a police duty to round up the unvaccinated, people are less afraid of the consequences of failure to have their children vaccinated. It was some time, too, before the new system was thoroughly going and that may also account in part. However steps will be taken in future to follow up every case of failure to vaccinate, and a definite result recorded.

IV. VITAL STATISTICS.

The following statistics are calculated on an estimated mean annual population of 442,454 made up as follows:—

	Males.	Females.	Total
Europeans	3,256	1,579	4,835
Eurasians	2,481	2,820	5,301
Chinese	228,178	121,759	349,937
Malays	20,433	17,765	38,198
Indians	30,527	5,995	36,522
Others	4,280	3,381	7,661
Total	289,155	153,299	442,454

The following return gives the population, the number and rates per 1,000 of births, infantile deaths and deaths at all ages for the last 10 years:—

Year	Population	Births		Infantile deaths		Deaths at all ages	
		No.	Rate	No.	Rate	No.	Rate
1918	312,995	8,065	25.76	2,131	264.2	13,172	41.08
1919	321,480	8,535	26.54	2,234	251.7	10,756	33.45
1920	330,303	8,969	27.15	2,233	248.9	11,731	35.51
1921	351,461	10,237	29.12	2,383	232.7	11,947	33.99
1922	362,597	10,368	28.59	2,488	239.9	11,553	31.86
1923	373,513	10,757	28.79	2,431	225.9	10,049	26.90
1924	384,758	11,757	30.55	2,614	222.3	10,420	27.08
1925	396,341	12,363	31.19	2,600	210.3	11,184	28.21
1926	408,273	12,871	31.52	2,987	232.0	13,085	32.04
1927	428,153	14,152	33.05	3,221	227.6	14,165	33.08
Average for 10 years	366,987	10,807	29.22	2,532	235.5	11,806	32.32
1928	442,454	15,540	35.12	3,142	202.1	12,584	28.44

I. BIRTHS.

The total number of births registered during the year was 15,540 compared with 14,152 in 1927 and 12,871 in 1926.

There were 8,218 males and 7,322 female births.

The birth rate was 35.12 per mille as compared with 33.05 in 1927 and 31.52 in 1926.

The birth rate is the highest recorded.

The following return gives the number of births and the birth rate for each month of the year:—

Month	Births	Birth Rate	Month	Births	Birth Rate
January ..	1,198	32.49	July ..	1,310	35.52
February ..	1,171	31.75	August ..	1,376	37.31
March ..	1,178	31.94	September	1,298	35.20
April ..	1,213	32.89	October ..	1,485	40.27
May ..	1,300	35.25	November	1,443	39.13
June ..	1,219	33.06	December	1,349	36.58

The following return shows the number of births and birth rate for each nationality:—

	Males	Females	Total	Birth Rate
Europeans ..	67	67	134	27.71
Eurasians ..	68	70	138	26.03
Chinese ..	6,753	5,934	12,687	36.25
Malays ..	807	767	1,576	41.25
Indians ..	421	381	802	21.95
Others ..	102	101	203	26.49
Total ..	8,218	7,322	15,540	35.12

There were 507 Still Births compared with 448 in 1927 and 407 in 1926.

II. DEATHS.

The total number of deaths for the year was 12,584 and the death rate 28.44 per 1,000 compared with 33.08 in 1927 and 32.04 in 1926.

654 persons died who had been less than 3 months resident in Singapore. Deducting these the death rate is reduced to 26.96 per 1,000.

The excess of births over deaths was 2,956.

The following return gives the number of deaths and the death rate for each month of the year:—

Month	Deaths	Death Rate	Month	Deaths	Death Rate
January ..	1,008	27.33	July	1,209	32.78
February ..	851	23.08	August ..	1,061	28.77
March ..	976	26.47	September	1,018	27.60
April ..	1,051	28.50	October ..	990	26.85
May ..	1,168	31.67	November	1,098	29.77
June ..	1,138	30.86	December	1,016	27.55

The death rates for the different nationalities were:—

	1928			1927		
	Males	Females	Total	Males	Females	Total
Europeans ..	14.12	8.86	12.40	13.73	6.84	11.47
Eurasians ..	19.75	17.02	18.29	20.86	20.33	20.58
Chinese ..	31.42	25.73	29.44	36.58	28.12	33.67
Malays ..	29.51	27.58	28.61	41.85	37.66	39.91
Indians ..	22.70	40.70	25.65	27.11	40.96	29.37
Others ..	13.55	10.35	12.13	13.36	9.81	11.82
Total ..	29.80	25.86	28.44	35.22	28.98	33.08

MORTALITY BY NATIONALITIES.

The following return gives the number of deaths from each cause among males and females of the different nationalities. The classification followed is that of the International list (1926).

I. General Diseases.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
1. Enteric Fever.	1a. Typhoid Fever.		1	1	..	1	106	16	2	..	9	..	..	1	M F	118 19	137
	1b. Paratyphoid fever.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
2. Typhus Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
3. Relapsing Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
4. Mediterranean Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
5. Malaria.			..	1	2	2	767	208	59	41	83	24	7	2	M F	918 278	1,196
6. Small-pox.			..	..	..	..	..	1	..	..	1	..	..	..	M F	1 1	2
7. Measles.			1	..	..	..	4	..	..	..	..	..	..	..	M F	5 0	5
8. Scarlet Fever.			1	..	..	..	..	..	1	..	..	..	..	..	M F	2 0	2
9. Whooping Cough.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
10. Diphtheria.			..	..	..	..	2	4	..	..	1	..	1	..	M F	4 4	8
		Carried forward	3	2	2	3	880	229	62	41	94	24	8	3			

MORTALITY BY NATIONALITIES.

I. General Diseases.			Europeans M	Europeans F	Eurasians M	Eurasians F	Chinese M	Chinese F	Malays M	Malays F	Indians M	Indians F	Others M	Others F	Sex	Totals	
		Brought forward	3	2	2	3	880	229	62	41	94	24	8	3			
11. Influenza.	11a. With pulmonary complications.	(1) With pneumonic complications.	..	..	..	..	4	3	5	6	4	..	1	..	M F	14 9	23
		(2) With other pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	11b. Without pulmonary complications.	(1) With non-pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	F M	0 0	0
		(2) Without stated complications.	..	..	..	..	11	7	8	4	7	1	1	..	M F	27 12	39
12. Miliary Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M M	0 0	0
13. Mumps.			..	..	..	..	..	..	..	..	..	..	..	..	F M	0 0	0
14. Asiatic Cholera.			..	..	1	..	7	..	..	..	2	..	..	..	M F	10 0	10
15. Cholera nostras.			..	..	..	..	..	..	..	..	..	..	..	..	F F	0 0	0
16. Dysentery.	16a. Amoebic.		..	..	..	..	78	3	1	..	12	1	1	..	M F	92 4	96
	16b. Bacillary.		1	..	1	..	97	6	3	..	10	..	1	..	M F	113 6	119
	16c. Other or Uuspecified.		..	..	..	..	185	65	5	3	6	3	..	..	M F	196 71	267
		Carried forward	4	2	4	3	1262	313	84	54	135	29	12	3			

MORTALITY BY NATIONALITIES.

I. General Diseases.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	4	2	4	3	1262	313	84	54	135	29	12	3			
17. Plague.	17a. Bubonic.		..	..	..	..	1	..	..	..	3	..	..	..	M F	4 0	4
	17b. Pneumonic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17c. Septicaemic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17d. Not otherwise defined.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
18. Yellow Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
19. Spirochaetosis icterohaemorrhagica.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
20. Leprosy.			..	..	..	..	12	5	..	..	1	2	..	..	M F	13 7	20
21. Erysipelas.			..	..	..	..	1	..	..	..	1	..	..	..	M F	2 0	2
22. Acute Poliomyelitis.	(1) Acute poliomyelitis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Acute polioencephalitis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
23. Encephalitis lethargica.			1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
24. Meningococcal meningitis.			..	..	..	..	3	..	..	..	8	..	..	..	M F	11 0	11
		Carried forward	5	2	4	3	1279	318	84	54	148	31	12	3			

MORTALITY BY NATIONALITIES.

I. General Diseases.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	5	2	4	3	1279	318	84	54	148	31	12	3			
25. Other epidemic and endemic diseases.	(1) German Measles.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Varicella.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 25.		1	..	..	1	..	..	..	..	..	..	..	..	M F	1 1	2
26. Glanders.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
27. Anthrax.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
28. Rabies.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
29. Tetanus.			..	..	..	..	79	58	2	3	3	1	..	..	M F	84 62	146
30. Mycoses.	(1) Actinomycosis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other mycoses.		..	..	..	..	1	1	1	..	..	..	..	..	M F	2 1	3
31. Tuberculosis of the respiratory system.			2	1	6	4	922	179	45	43	78	23	6	4	M F	1,059 254	1,313
32. Tuberculosis of the central nervous system.			..	..	..	..	21	11	..	1	1	1	..	..	M F	22 13	35
33. Tuberculosis of intestines and peritoneum.			..	1	..	..	3	5	..	..	..	2	..	..	M F	3 8	11
		Carried forward	8	4	10	8	2305	572	132	101	230	58	18	7			

MORTALITY BY NATIONALITIES.

I. General Diseases.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	8	4	10	8	2305	572	132	101	230	58	18	7			
34. Tuberculosis of vertebral column.			..	..	..	..	4	1	..	..	1	..	..	..	M F	5 1	6
35. Tuberculosis of joints.			..	..	..	..	5	5	2	..	..	..	..	..	M F	7 5	12
36. Tuberculosis of other organs.	a. Skin and subcutaneous tissues.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Bones		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Lymphatic system.		..	..	..	..	1	..	1	..	..	..	..	..	M F	2 0	2
	d. Genito-Urinary system.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	e. Other sites included under 36.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
37. Disseminated tuberculosis.	a. Acute.		..	..	..	..	8	..	..	..	..	1	..	..	M F	8 1	9
	b. Chronic or unstated.		..	..	..	..	13	6	2	..	1	..	..	1	M F	16 7	23
38. Syphilis.			..	..	..	..	113	28	2	3	5	4	2	1	M F	122 36	158
39. Soft chancre.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
40. Gonococcal Infection.	(1) Gonococcal infection (opthalmia excepted)		..	..	..	..	1	..	..	..	3	1	..	..	M F	4 1	5
		Carried forward	8	4	10	8	2450	612	139	104	240	64	20	9			

I. General Diseases.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	8	4	10	8	2450	612	139	104	240	64	20	9			
	(2) Gonorrhoeal or purulent ophthalmia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
41. Purulent infection, Septicaemia.			1	1	..	..	75	22	..	3	3	1	..	2	M F	79 29	108
42. Other infectious diseases.	(1) Vaccinia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases included under 42.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
II. General Diseases not included above.																	
43. Cancer of the buccal cavity.			1	..	..	1	3	3	..	1	..	1	..	..	M F	6 4	10
44. Cancer of the pharynx, etc.			..	1	..	2	71	7	..	2	1	1	2	..	M F	74 13	87
45. Cancer of the peritoneum, intestines and rectum.			1	..	..	1	3	1	..	..	..	..	..	..	M F	4 2	6
46. Cancer of the female genital organs.			..	..	..	..	..	8	..	..	..	2	..	1	M F	0 11	11
47. Cancer of the breast.			..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
48. Cancer of the skin.			..	..	..	..	..	1	..	..	..	..	..	1	M F	0 2	2
		Carried forward	11	6	10	12	2602	656	139	110	244	69	22	13			

MORTALITY BY NATIONALITIES.

II. General Diseases not included above.			Europeans M	Europeans F	Eurasians M	Eurasians F	Chinese M	Chinese F	Malays M	Malays F	Indians M	Indians F	Others M	Others F	Sex	Totals	
		Brought forward	11	6	10	12	2602	656	139	110	244	69	22	13			
49. Cancer of other or unspecified organs.			2	..	1	1	15	5	..	..	2	..	..	..	M F	20 6	26
50. Tumours not returned as malignant.			..	..	..	..	3	..	..	..	1	..	..	..	M F	4 0	4
51. Rheumatic Fever.			..	..	..	..	5	3	2	..	1	..	..	..	M F	8 3	11
52. Chronic rheumatism, Osteo-arthritis, Gout.	(1) Chronic rheumatism chronic arthritis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Rheumatoid arthritis, Osteo-arthritis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Gout.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
53. Scurvy.			..	..	..	..	1	..	..	..	..	1	..	..	M F	1 1	2
54. Pellagra.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
55. Beri-beri.			..	..	..	..	665	149	31	12	9	1	2	..	M F	707 162	869
56. Rickets			..	..	..	1	..	1	..	..	..	..	..	..	M F	0 2	2
57. Diabetes.			1	..	1	..	7	5	2	1	3	2	..	..	M F	14 8	22
58. Anaemia, Chlorosis.	a. Pernicious anaemia.		..	..	..	..	9	11	..	..	2	3	..	..	M F	11 14	25
		Carried forward	14	6	12	14	3307	830	174	123	262	76	24	13			

II. General Diseases not included above.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	14	6	12	14	3307	830	174	123	262	76	24	13			
	b. Other anaemias and chlorosis.		..	..	..	..	3	5	..	1	4	..	..	..	M F	7 6	13
59. Diseases of the pituitary gland.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
60. Diseases of the thyroid gland.	a. Exophthalmic goitre.		..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
	b. Other diseases of the thyroid gland.	(1) Myxoedema.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Cretinism.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(3) Other diseases included under 60b.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
61. Diseases of the parathyroid glands.	(1) Tetany.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases of the parathyroid glands.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
62. Diseases of the thymus.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
63. Diseases of the adrenals.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
64. Diseases of the spleen.			1	..	..	..	5	1	..	..	..	..	..	..	M F	6 1	7
65. Leukaemia, Lymphadenoma.	a. Leukaemia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	15	6	12	14	3315	838	174	124	266	76	24	13			

MORTALITY BY NATIONALITIES.

II. General Diseases not included above.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	15	6	12	14	3315	838	174	124	266	76	24	13			
	b. Lymphadenoma.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
66. Alcoholism (acute or chronic).			..	..	..	..	..	..	..	..	..	..	1	..	M F	1 0	1
67. Chronic poisoning by mineral substances.	(1) Occupational lead poisoning.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(2) Other chronic poisoning by mineral substances.		..	..	..	..	..	..	..	..	2	..	..	..	M F	2 0	2
68. Chronic poisoning by organic substances.			..	..	..	..	5	..	..	..	..	..	..	..	M F	5 0	5
69. Other general diseases.	(1) Purpura.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(2) Haemophilia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 69.		1	..	..	..	10	5	3	..	1	1	..	..	M F	15 6	21
III. Diseases of the Nervous System and Sense Organs.																	
70. Encephalitis.	(1) Cerebral abscess.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(2) Other diseases included under 70.		..	..	..	..	1	..	..	..	1	..	..	..	M F	2 0	2
71. Meningitis.			1	..	..	..	13	12	..	1	2	1	1	..	M F	17 14	31
		Carried forward	17	6	12	14	3347	856	177	125	272	78	26	13			

III. Diseases of the Nervous System and Sense Organs.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	17	6	12	14	3347	856	177	125	272	78	26	13			
72. Tabes dorsalis (Locomotor ataxy).			..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
73. Other diseases of the spinal cord.			..	..	..	..	1	..	1	..	1	..	..	..	M F	3 0	3
74. Cerebral haemorrhage, Apoplexy, etc.	a. Cerebral haemorrhage.	(1) Cerebral haemorrhage so returned.	..	..	3	1	38	18	1	1	3	..	..	..	M F	45 20	65
		(2) Apoplexy (lesion unstated).	..	1	2	..	7	7	..	..	3	..	2	1	M F	14 9	23
	b. Cerebral thrombosis and embolism.	(1) Cerebral embolism.	..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
		(2) Cerebral thrombosis.	..	..	..	..	1	..	..	..	1	1	..	..	M F	2 1	3
75. Paralysis of unstated origin.	a. Hemiplegia.		..	..	2	..	12	2	..	1	1	1	1	..	M F	16 4	20
	b. Other forms of paralysis.		..	..	..	..	11	7	..	..	..	1	..	..	M F	11 8	19
76. General paralysis of the insane.			..	..	..	..	14	..	..	..	..	..	..	..	M F	14 0	14
77. Other forms of insanity.			1	..	..	..	5	1	..	..	1	..	..	..	M F	7 1	8
78. Epilepsy.			..	..	..	..	..	1	..	..	..	1	..	..	M F	0 2	2
		Carried forward	18	7	19	15	3439	893	179	127	282	82	29	14			

MORTALITY BY NATIONALITIES.

III. Diseases of the Nervous System and Sense Organs.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	18	7	19	15	3439	893	179	127	282	82	29	14			
79. Convulsions (non puerperal 5 years and over).			..	..	..	..	2	6	1	2	..	..	..	..	M F	3 8	11
80. Infantile convulsions (under 5 years of age).			..	1	4	2	510	402	110	109	14	18	..	1	M F	638 533	1,171
81. Chorea.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
82. Hysteria and neuritis.	(1) Hysteria, Neuralgia.		..	..	..	..	..	..	..	1	..	..	..	..	M F	0 1	1
	(2) Neuritis.		..	..	..	..	11	15	..	8	4	2	..	1	M F	15 26	41
83. Cerebral softening.			..	..	..	..	4	..	1	..	..	..	..	..	M F	5 0	5
84. Other diseases of the nervous system.	(1) Idiocy, Imbecility.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Cerebral tumour.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(3) Disseminated sclerosis.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(4) Paralysis agitans.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(5) Other diseases included under 84.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	18	8	23	17	3967	1317	291	247	300	102	29	16			

III. Diseases of the Nervous System and Sense Organs.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	18	8	23	17	3967	1317	291	247	300	102	29	16			
85. Diseases of the eye and annexa.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
86. Diseases of the ear and mastoid sinus.	(1) Diseases of the mastoid sinus.		..	..	..	..	1	2	..	..	..	..	..	..	M F	1 2	3
	(2) Diseases of the ear.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
IV. Diseases of the Circulatory System.																	
87. Pericarditis.			..	..	..	..	5	..	..	..	1	..	1	..	M F	7 0	7
88. Acute endocarditis and myocarditis.	(1) Malignant endocarditis.		..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
	(2) Other acute endocarditis.		..	..	..	..	11	..	..	..	3	..	..	..	M F	14 0	14
	(3) Acute myocarditis.		1	..	..	..	31	7	..	..	6	1	..	..	M F	38 8	46
89. Angina pectoris.			..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
90. Other diseases of the heart.	(1) Aortic valve disease.		2	..	..	1	56	20	3	3	7	..	..	1	M F	68 25	93
	(2) Mitral valve disease.		..	..	..	..	4	2	..	..	..	..	..	..	M F	4 2	6
	(3) Aortic and mitral valve disease.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	21	8	23	18	4076	1350	295	250	317	103	30	17			

MORTALITY BY NATIONALITIES.

IV. Diseases of the Circulatory System.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	21	8	23	18	4076	1350	295	250	317	103	30	17			
	(4) Other or unspecified valve disease.		1	..	..	..	6	2	..	..	..	..	..	..	M F	7 2	9
	(5) Fatty heart.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(6) Dilatation of heart (cause unspecified)		1	..	..	..	..	..	1	..	..	..	..	..	M F	2 0	2
	(7) Other or unspecified myocardial disease.		..	1	..	1	14	5	..	..	3	..	..	..	M F	17 7	24
	(8) Disordered action of heart.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(9) Heart disease (undefined).		..	..	..	..	6	..	..	1	1	1	..	..	M F	7 2	9
91. Diseases of the arteries.	a. Aneurysm.		..	..	..	..	6	..	..	1	..	..	..	..	M F	6 1	7
	b. Arterio-sclerosis.	(1) Arterio sclerosis with record of cerebral vascular lesion.	2	1	1	..	7	..	2	..	1	..	1	1	M F	14 2	16
		(2) Arterio sclerosis without record of cerebral vascular lesion.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Other diseases of the arteries.		..	..	..	..	8	1	..	..	1	..	..	..	M F	9 1	10
		Carried forward	25	10	24	19	4123	1359	298	252	323	104	31	18			

IV. Diseases of the Circulatory System.				Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
				M	F	M	F	M	F	M	F	M	F	M	F			
			Brought forward	25	10	24	19	4123	1359	298	252	323	104	31	18			
92.	Embolism and thrombosis (not cerbral).			..	..	..	1	..	8	..	1	..	2	..	..	M F	0 12	12
93.	Diseases of the veins (Varix, haemorrhoids, phlebitis, etc.)			..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
94.	Diseases of the lymphatic system.			..	..	..	..	..	..	..	..	..	..	..	..	F M	0 0	0
95.	Haemorrhage without stated cause.			..	..	..	..	6	..	..	..	..	1	..	..	M F	6 1	7
96.	Other diseases of the circulatory system.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
V. Diseases of the Respiratory System.																		
97.	Diseases of the nasal fossæ and annexa.	(1) Diseases of the nose.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Diseases of the accessory nasal sinuses.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
98.	Diseases of the Larynx.	(1) Laryngismus stridulus.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
		(2) Laryngitis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(3) Other diseases of the larynx.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
			Carried forward	25	10	24	20	4133	1368	298	253	323	117	31	18			

MORTALITY BY NATIONALITIES.

V. Diseases of the Respiratory System.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	25	10	24	20	4133	1368	298	253	323	117	31	18			
99. Bronchitis.	a. Acute bronchitis.		..	..	..	..	12	15	2	1	1	1	..	..	M F	15 17	32
	b. Chronic bronchitis		..	..	..	1	10	4	..	1	..	..	..	..	M F	10 6	16
	c. & d. Bronchitis not distinguished as acute or chronic.		..	..	1	..	67	59	21	14	5	6	..	..	M F	94 79	173
100. Broncho-pneumonia.			2	..	5	6	387	327	18	27	32	16	3	2	M F	447 378	825
101. Pneumonia, lobar or not otherwise defined.	a. Lobar pneumonia.		2	..	..	2	321	62	29	15	120	16	3	1	M F	475 96	571
	b. Pneumonia not otherwise defined.		..	..	..	1	241	89	24	12	28	11	4	..	M F	297 113	410
102. Pleurisy.	1. Empyema.		..	..	..	..	17	..	1	..	3	..	..	..	M F	21 0	21
	2. Other pleurisy.		..	..	..	..	6	..	..	..	4	..	..	..	M F	10 0	10
103. Congestion and haemorrhagic infarct of lung.			..	..	1	..	5	1	..	..	..	1	..	..	M F	6 2	8
104. Gangrene of the lung.			..	..	..	..	3	..	..	..	1	..	..	..	M F	4 0	4
105. Asthma.			..	..	1	..	21	4	5	1	..	..	..	..	M F	27 5	32
106. Pulmonary emphysema.			..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
		Carried forward	29	10	32	30	5223	1929	398	324	518	158	41	21			

V. Diseases of the Respiratory System.				Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
				M	F	M	F	M	F	M	F	M	F	M	F			
			Brought forward	29	10	32	30	5223	1929	398	324	518	158	41	21			
107.	Other diseases of the respiratory system.	a. Chronic interstitial pneumonia including occupational diseases of the lung.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		b. Diseases of the mediastinum.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		c. Other diseases included under 107.		..	..	..	..	10	..	1	..	..	..	..	..	M F	11 0	11
VI. Diseases of the Digestive System.																		
108.	Diseases of the buccal cavity and annexa.	(1) Diseases of the teeth and gums.		..	..	..	..	..	1	..	1	..	..	..	..	M F	0 2	2
		(2) Ludwigs angina.		..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
		(3) Other diseases included under 108.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
109.	Diseases of the pharynx and tonsils.	(1) Tonsillitis, Adenoid Vegetations.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Other diseases included under 109.		..	1	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
110.	Diseases of the oesophagus.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
111.	Ulcer of the stomach or duodenum.	a. Ulcer of the stomach.		1	..	..	..	23	2	..	..	2	..	..	..	M F	26 2	28
			Carried forward	30	11	32	30	5258	1933	399	325	520	158	41	21			

MORTALITY BY NATIONALITIES.

VI. Diseases of the Digestive System.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	30	11	32	30	5258	1933	399	325	520	158	41	21			
	b. Ulcer of the duodenum.		..	..	..	..	2	1	..	..	..	..	..	..	M F	2 1	3
112. Other diseases of the stomach.	1. Inflammation of the stomach.		..	..	..	..	53	27	21	22	8	2	..	1	M F	82 52	134
	2. Other diseases included under 112.		..	..	..	..	7	..	..	..	..	..	..	..	M F	7 0	7
113. and 114. Diarrhoea and enteritis.	(1) Ulceration of the intestines.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(2) Colitis.		..	..	..	..	8	10	1	..	1	..	..	..	M F	10 10	20
	(3) Other diseases included under 113 and 114.		2	1	4	5	304	247	17	14	8	9	..	2	M F	335 278	613
115. Ankylostomiasis.			..	..	..	..	5	3	1	1	6	..	1	..	M F	13 4	17
116. Diseases due to other intestinal parasites.	a. Cestodes, (hydatids of liver excepted).		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Trematodes.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Nematodes other than Ankylostoma.		..	..	..	..	1	2	..	..	..	..	..	..	M F	1 2	3
	d. Coccidia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	e. Other specified parasites in 116.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	32	12	36	35	5639	2223	439	362	543	169	42	24			

VI. Diseases of the Digestive System.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	32	12	36	35	5639	2223	439	362	543	169	42	24			
	f. Undefined intestinal parasites.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
117. Appendicitis.			3	..	..	..	8	..	..	..	1	..	2	..	M F	14 0	14
118. Hernia, Intestinal obstruction.	a. Hernia.		1	..	..	..	7	..	..	..	3	..	..	..	M F	11 0	11
	b. Intestinal obstruction.		..	..	..	1	6	2	..	..	3	..	..	1	M F	9 4	13
119. Other diseases of the intestines.	1. Intestinal stasis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other diseases included under 119.		..	..	..	..	..	2	..	..	1	..	..	..	M F	1 2	3
120. Acute yellow atrophy of the liver.			..	..	..	..	2	1	..	..	..	..	..	..	M F	2 1	3
121. Hydatid tumour of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
122. Cirrhosis of the liver.	a. Returned as alcoholic.		..	..	..	..	25	7	8	..	3	..	..	..	M F	36 7	43
	b. Not returned as alcoholic.		..	..	..	..	28	2	3	..	1	1	..	1	M F	32 4	36
123. Biliary Calculi.			..	..	..	..	2	1	..	..	..	..	..	..	M F	2 1	3
124. Other diseases of the liver.			..	..	1	..	22	1	..	..	1	..	..	1	M F	24 2	26
		Carried forward	36	12	37	36	5739	2239	450	362	556	170	44	27			

MORTALITY BY NATIONALITIES.

VI. Diseases of the Digestive System.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	36	12	37	36	5739	2239	450	362	556	170	44	27			
125. Diseases of the pancreas.			..	..	..	..	2	..	..	..	2	..	..	..	M F	4 0	4
126. Peritonitis without stated cause.			1	..	1	1	41	8	..	..	1	..	1	..	M F	45 9	54
127. Other diseases of the digestive system.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa.																	
128. Acute nephritis. (including unspecified under 10 years of age).			..	..	1	..	21	22	..	..	1	..	1	..	M F	24 22	46
129. Chronic nephritis. (including unspecified over 10 years of age).			1	..	3	1	289	146	12	6	31	4	3	3	M F	339 160	499
130. Chyluria.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
131. Other diseases of the kidney and annexa.			..	..	..	1	13	1	1	..	6	3	..	..	M F	20 5	25
132. Calculi of the urinary passages.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
133. Diseases of the bladder.	1. Cystitis.		..	..	..	..	9	3	..	..	..	..	..	..	M F	9 3	12
		Carried forward	38	12	42	39	6114	2419	463	368	597	177	49	30			

VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	38	12	42	39	6114	2419	463	368	597	177	49	30			
	2. Other diseases of the bladder.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
134. Diseases of the urethra, urinary abscess, etc.	a. Stricture of the urethra, etc.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Other diseases of the urethra.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
135. Diseases of the prostate.			..	..	..	..	2	..	..	..	..	..	1	..	M F	3 0	3
136. Non-venereal diseases of the male genital organs.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
137. Cysts, and other tumours of the ovary not returned as malignant.			..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
138. Salpingitis and pelvic abscess in females.	1. Salpingitis.		..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
	2. Pelvic abscess in females.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
139. Tumours of the uterus not returned as malignant.			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
140. Non-puerperal uterine-haemorrhage.			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
		Carried forward	38	12	42	39	6118	2426	463	368	597	177	50	30			

MORTALITY BY NATIONALITIES.

VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	38	12	42	39	6118	2426	463	368	597	177	50	30			
141. Other diseases of the female genital organs.	1. Other diseases of the uterus.		..	..	..	..	..	..	..	..	..	1	..	..	M F	0 1	1
	2. Diseases of the female genital organs not included under other headings.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
142. Non-puerperal diseases of the breast.			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
VIII. The Puerperal State.																	
143. Accidents of pregnancy.	a. Abortion.		..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
	b. Ectopic gestation.		..	..	..	..	..	3	..	..	..	..	..	..	M F	0 3	3
	c. Other accidents of pregnancy.		..	..	..	..	..	5	..	1	..	..	..	..	M F	0 6	6
144. Puerperal Hæmorrhage.			..	..	..	..	..	9	..	3	..	1	..	..	M F	0 13	13
145. Other accidents of childbirth.			..	..	..	..	..	12	..	8	..	2	..	..	M F	0 22	22
146. Puerperal sepsis.			..	..	..	..	..	6	..	2	..	4	..	..	M F	0 12	12
147. Puerperal phlegmasia alba dolens, embolism and sudden death.	1. Puerperal phlegmasia alba dolens not returned as septic.		..	..	..	..	..	..	..	1	..	..	..	..	M F	0 1	1
		Carried forward	38	12	42	39	6118	2464	463	383	597	185	50	30			

VIII. The Puerperal State.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	38	12	42	39	6118	2464	463	383	597	185	50	30			
	2. Puerperal embolism and sudden death.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
148. Puerperal albuminuria and convulsions.			..	..	..	..	..	6	..	2	..	2	..	1	M F	0 11	11
149. Childbirth not assignable to other headings (puerperal insanity).			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
150. Puerperal diseases of the breast.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
IX. Diseases of the Skin and Cellular Tissue.																	
151. Gangrene.	1. Senile gangrene. (aged 60 and over).		..	..	..	..	1	..	..	..	1	..	..	..	M F	2 0	2
	2. Other gangrene.		..	..	..	..	8	3	1	..	2	1	..	..	M F	11 4	15
152. Carbuncle, boil.			1	..	..	1	10	4	1	..	..	..	..	..	M F	12 5	17
153. Cellulitis, acute abscess.	1. Cellulitis.		..	..	..	..	7	5	..	..	1	1	..	..	M F	8 6	14
	2. Acute abscess.		..	..	..	..	1	2	..	..	..	..	..	..	M F	1 2	3
154. Other diseases of the skin and its annexa.	1. Ulcer, bedsore.		..	..	..	..	6	1	1	..	..	..	..	..	M F	7 1	8
		Carried forward	39	12	42	40	6151	2485	466	385	601	189	50	31			

MORTALITY BY NATIONALITIES.

IX. Diseases of the Skin and Cellular Tissue.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	39	12	42	40	6151	2485	466	385	601	189	50	31			
	2. Eczema.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	3. Pemphigus.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	4. Other diseases included under 154.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
X. Diseases of the Bones and Organs of Locomotion.																	
155. Diseases of the Bones.	1. Acute infective osteomyelitis and periostitis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other diseases of the bones.		..	..	..	..	..	..	..	..	..	..	1	..	M F	1 0	1
156. Diseases of the joints			..	..	..	..	1	1	..	..	1	..	..	..	M F	2 1	3
157. Amputation.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
158. Other diseases of the organs of locomotion.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
XI. Congenital Malformations.																	
159. Congenital malformations.	1. Congenital hydrocephalus.		..	..	..	..	..	..	..	..	..	..	1	..	M F	1 0	1
		Carried forward	39	12	42	40	6153	2486	466	385	602	189	52	31			

			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
			M	F	M	F	M	F	M	F	M	F	M	F			
XI. Congenital Malformations.																	
		Brought forward	39	12	42	40	6153	2486	466	385	602	189	52	31			
	2. Congenital malformation of heart.		..	..	..	1	2	1	..	..	..	..	..	..	M F	2 2	4
	3. Other congenital malformations.		..	..	..	..	4	2	1	1	..	..	..	..	M F	5 3	8
XII. Diseases of Early Infancy.																	
160. Congenital debility, sclerema and icterus.	1. Congenital debility and sclerema.		..	..	1	..	52	60	29	19	15	8	..	..	M F	97 87	184
	2. Icterus neonatorum.		..	..	..	..	4	5	1	1	..	..	..	1	M F	5 7	12
161. Premature birth, injury at birth.	1. Premature birth.		1	1	..	..	149	177	28	13	8	9	..	..	M F	186 200	386
	2. Injury at birth.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
162. Other diseases peculiar to early infancy.	1. Diseases of the umbilicus.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
	2. Atelectasis.		..	..	2	..	8	7	1	..	1	2	..	1	M F	12 10	22
	3. Other diseases included under 162.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
163. Lack of care.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	40	13	45	41	6374	2738	526	419	626	208	52	33			

MORTALITY BY NATIONALITIES.

XIII. Old Age.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	40	13	45	41	6374	2738	526	419	626	208	52	33			
164. Old age.	1. Senile dementia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other forms of senile decay.		2	1	2	5	202	162	42	42	7	17	2	2	M F	257 229	486
XIV. External Causes.																	
165. & 166. Suicide by solid or liquid poisons and corrosive substances.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
167. Suicide by poisonous gas.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
168. Suicide by hanging or strangulation.			..	..	..	..	38	5	1	1	4	1	..	..	M F	43 7	50
169. Suicide by drowning.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
170. Suicide by firearms.			1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
171. Suicide by cutting or piercing instruments.			..	..	..	..	5	1	..	..	..	..	..	..	M F	5 1	6
172. Suicide by jumping from high place.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
173. Suicide by crushing.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	43	14	47	46	6620	2906	569	462	637	226	54	35			

XIV. External Causes.		Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
		M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward	43	14	47	46	6620	2906	569	462	637	226	54	35			
174. Suicide by other means.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
175. Food poisoning.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
176. Poisoning by venomous animals.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
177. Other acute accidental poisoning (not by gas).		1	..	..	..	2	4	..	..	1	1	..	..	M F	4 5	9
178. Conflagration.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
179. Accidental burns (conflagration excepted).		..	..	..	..	10	4	1	..	1	..	..	..	M F	12 4	16
180. Accidental mechanical suffocation.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
181. Accidental absorption of irrespirable or poisonous gas.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
182. Accidental drowning.		..	..	..	..	11	2	..	..	..	1	..	..	M F	11 3	14
183. Accidental injury by firearms.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
184. Accidental injury by cutting or piercing instruments.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	Carried forward	44	14	47	46	6645	2917	570	462	639	228	54	35			

MORTALITY BY NATIONALITIES.

XIV. External Causes.	Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
	M	F	M	F	M	F	M	F	M	F	M	F			
Brought forward	44	14	47	46	6645	2917	570	462	639	228	54	35			
185. Accidental injury by fall.	..	..	..	..	9	..	..	..	3	..	..	..	M F	12 0	12
186. Accidental injury in mining & quarrying.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
187. Accidental injury by machinery.	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
188. Accidental injury by other forms of crushing (road vehicles on railways, etc.)	2	..	1	..	21	6	1	..	6	..	1	..	M F	32 6	38
189. Injury by animals (poisoning by venomous animals excepted).	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
190. Wounds of war.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
191. Execution of civilians by belligerent armies.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
192. Hunger or thirst.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
193. Excessive cold.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
194. Excessive heat.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	46	14	48	46	6677	2923	571	462	648	228	55	35			

XIV. External Causes.	Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
	M	F	M	F	M	F	M	F	M	F	M	F			
Brought forward	46	14	48	46	6677	2923	571	462	648	228	55	35			
195. Lightning.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
196. Electricity (Lightning expected).	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
197. Homicide by firearms.	..	..	..	..	9	..	..	..	1	..	..	..	M F	10 0	10
198. Homicide by cutting or piercing instruments.	..	..	..	..	19	1	1	..	..	..	..	..	M F	20 1	21
199. Homicide by other means.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
200. Infanticide (under one year).	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
201. Fracture (cause not specified).	..	..	..	1	64	8	3	..	8	..	1	..	M F	76 9	85
202. Other and unstated forms of accidental violence, Execution.	..	..	..	..	9	1	2	..	1	2	1	..	M F	13 3	16
203. Violent deaths of unstated nature (i.e. accidental, suicidal &c.) and cause.	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
XV. Ill Defined Diseases.															
204. Sudden death.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
Carried forward	46	14	48	47	6779	2933	577	462	658	230	57	35			

MORTALITY BY NATIONALITIES.

XV. Ill Defined Diseases.				Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Total	
				M	F	M	F	M	F	M	F	M	F	M	F			
			Brought forward	46	14	48	47	6779	2933	577	462	658	230	57	35			
205.	Cause of death unstated or ill-defined.	1. Heart failure (age 1—70).		..	..	..	..	1	1	..	..	4	2	1	..	M F	6 3	9
		2. Other ill-defined causes.		..	..	1	1	366	194	26	27	29	12	..	..	M F	422 234	656
		3. Cause not specified.		..	..	..	..	23	7	..	1	2	..	..	..	M F	25 8	33
			TOTAL	46	14	49	48	7169	3135	603	490	693	244	58	35	M F	8,618 3,966	12,584
				60		97		10,304		1,093		937		93				

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

I. General Diseases.			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
1. Enteric Fever.	1a. Typhoid Fever.		..	..	..	..	..	..	1	1	2	3	4	2	37	4	50	7	17	2	6	..	1	..	..	..	M F	118 19	137
	1b. Paratyphoid fever.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
2. Typhus Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
3. Relapsing Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
4. Mediterranean Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
5. Malaria.			2	2	5	6	21	14	34	20	17	20	67	22	143	35	275	54	203	62	113	27	37	16	1	..	M F	918 278	1,196
6. Small-pox.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	M F	1 1	2
7. Measles.			1	..	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	5 0	5
8. Scarlet Fever.			..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	2 0	2
9. Whooping Cough.			..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
10. Diphtheria.			..	..	..	..	2	3	..	1	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	4 4	8
11. Influenza.	11a. With pulmonary complications.	(1) With pneumonic complications.	1	..	..	..	2	2	..	1	..	..	..	..	1	..	2	4	2	..	1	..	5	2	..	..	M F	14 9	23
		(2) With other pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	11b. Without pulmonary complications.	(1) With non-pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Without stated complications.	2	..	3	3	3	3	..	2	1	..	3	..	..	1	4	1	3	..	2	2	6	..	..	..	M F	27 12	39
12. Miliary Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
13. Mumps.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	6	2	11	9	31	22	35	25	21	23	74	24	183	40	331	66	225	64	122	30	50	18	1	..			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

I. General Diseases—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		SEX	TOTALS	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	6	2	11	9	31	22	35	25	21	23	74	24	183	40	331	66	225	64	122	30	50	18	1	..			
14. Asiatic Cholera.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	5	..	2	..	2	..	..	..	..	..	M F	10 0	10
15. Cholera nostras.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
16. Dysentery.	16a. Amoebic.		..	..	..	..	..	1	..	..	..	1	1	..	6	..	24	..	31	..	19	2	11	..	..	..	M F	92 4	96
	16b. Bacillary.		..	..	..	1	1	..	2	..	1	..	5	..	10	..	35	1	31	1	16	..	12	3	..	..	M F	113 6	119
	16c. Other or Unspecified.		1	1	1	1	4	4	7	2	5	1	2	1	9	3	28	16	39	9	62	19	38	14	..	..	M F	196 71	267
17. Plague.	17a. Bubonic.		..	..	..	..	..	..	..	..	1	..	1	..	1	..	1	..	..	..	..	..	..	..	..	..	M F	4 0	4
	17b. Pneumonic.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17c. Septicaemic.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17d. Not otherwise defined.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
18. Yellow Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
19. Spirochaetosis ictero—haemorrhagica.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
20. Leprosy.			..	..	..	..	..	..	..	..	..	1	..	1	2	..	5	1	2	2	2	1	2	1	..	..	M F	13 7	20
21. Erysipelas.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	M F	2 0	2
22. Acute Poliomyelitis.	(1) Acute poliomyelitis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Acute polioencephalitis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
23. Encephalitis lethargica.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
24. Meningococcal meningitis.			..	..	..	..	..	..	..	..	1	..	..	..	4	..	2	..	4	..	..	..	..	..	..	..	M F	11 0	11
		Carried forward ..	7	3	12	11	36	27	44	27	29	26	83	26	216	43	432	84	335	76	223	52	114	36	1				

I. General Diseases—*(contd.)*		Under 3 Months M	Under 3 Months F	3 to 12 Months M	3 to 12 Months F	1 to 5 Years M	1 to 5 Years F	5 to 10 Years M	5 to 10 Years F	10 to 15 Years M	10 to 15 Years F	15 to 20 Years M	15 to 20 Years F	20 to 25 Years M	20 to 25 Years F	25 to 35 Years M	25 to 35 Years F	35 to 45 Years M	35 to 45 Years F	45 to 55 Years M	45 to 55 Years F	Over 55 M	Over 55 F	Unknown M	Unknown F	Sex	Totals	
	Brought forward ..	7	3	12	11	36	27	44	27	29	26	83	26	216	43	432	84	335	76	223	52	114	36	1	..			
25. Other epidemic and endemic diseases.	(1) German Measles.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Varicella.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 25.	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 1	2
26. Glanders.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
27. Anthrax.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
28. Rabies.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
29. Tetanus.		64	60	1	..	2	1	..	1	1	..	2	..	2	..	5	..	3	..	3	..	1	..	..	..	M F	84 62	146
30. Mycoses.	(1) Actinomycosis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other mycoses.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	M F	2 1	3
31. Tuberculosis of the respiratory system.		..	..	2	..	2	6	4	1	1	2	26	15	68	22	243	71	335	63	265	48	112	26	1	..	M F	1,059 254	1,313
32. Tuberculosis of the central nervous system.		1	..	3	2	4	9	3	1	2	..	2	..	1	..	2	..	3	1	..	..	1	..	..	..	M F	22 13	35
33. Tuberculosis of intestines and peritoneum.		..	..	..	..	1	..	..	..	..	..	..	..	..	2	1	3	1	3	..	..	..	..	..	..	M F	3 8	11
34. Tuberculosis of vertebral column.		..	..	..	..	..	..	1	1	..	..	..	..	..	..	1	..	1	..	2	..	..	..	..	..	M F	5 1	6
35. Tuberculosis of joints.		..	..	..	..	..	..	1	3	..	..	..	..	..	..	2	..	4	1	..	1	..	..	..	..	M F	7 5	12
36. Tuberculosis of other organs.	a. Skin and subcutaneous tissues.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Bones.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Lymphatic system.	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	2 0	2
	Carried forward ..	72	63	18	13	46	44	53	34	33	28	113	41	287	67	687	159	682	144	495	101	229	62	2	..			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

I. General Diseases—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	72	63	18	13	46	44	53	34	33	28	113	41	287	67	687	159	682	144	495	101	229	62	2	..			
	d. Genito-Urinary system.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	e. Other sites included under 36.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
37. Disseminated tuberculosis.	a. Acute.		1	..	..	1	1	..	..	..	..	..	..	..	3	..	2	..	1	..	..	..	..	..	..	..	M F	8 1	9
	b. Chronic or unstated.		2	..	1	1	4	4	4	1	1	1	..	..	2	..	1	..	1	..	..	..	..	..	..	..	M F	16 7	23
38. Syphilis.			24	13	6	4	..	3	1	..	..	1	..	1	2	6	23	5	23	2	25	..	18	1	..	..	M F	122 36	158
39. Soft chancre.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
40. Gonococcal Infection.	(1) Gonococcal infection (ophthalmia excepted).		..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	..	..	..	1	1	..	..	..	M F	4 1	5
	(2) Gonorrhoeal or purulent ophthalmia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
41. Purulent infection. Septicaemia.			4	7	4	11	3	1	..	1	..	..	..	..	7	1	24	2	16	3	14	1	7	2	..	..	M F	79 29	108
42. Other infectious diseases.	(1) Vaccinia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases included under 42.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
II. General Diseases not included above.																													
43. Cancer of the buccal cavity.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	..	..	1	3	1	2	..	..	M F	4 6	10
44. Cancer of the pharynx, etc.			..	..	..	..	..	..	..	..	..	..	..	..	2	..	4	2	14	3	32	3	21	5	1	..	M F	74 13	87
45. Cancer of the peritoneum, intestines and rectum.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	2	1	..	..	..	M F	4 2	6
46. Cancer of the female genital organs.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	5	..	3	..	..	M F	0 11	11
47. Cancer of the breast.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	M F	0 2	2
48. Cancer of the skin.			..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	0 2	2
		Carried forward ..	103	84	29	30	54	52	58	36	34	30	113	42	305	74	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			

II. General Diseases not included above—(contd.)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	103	84	29	30	54	52	58	36	34	30	113	42	305	74	744	171	737	154	570	117	278	76	3	..			
49. Cancer of other or unspecified organs.			..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	9	1	7	..	3	4	..	..	M F	20 6	26
50. Tumours not returned as malignant.			..	..	..	..	..	..	..	..	..	..	..	..	2	..	1	..	..	..	1	..	..	..	..	..	M F	4 0	4
51. Rheumatic Fever.			..	..	..	..	..	..	..	1	..	1	..	..	1	..	2	1	..	..	4	..	1	..	..	..	M F	8 3	11
52. Chronic rheumatism, Osteo-arthritis, Gout.	(1) Chronic rheumatism chronic arthritis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Rheumatoid arthritis. (Osteo-arthrit's).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Gout.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
53. Scurvy.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	M F	1 1	2
54. Pellagra.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
55. Beri-beri.			..	..	1	2	3	..	..	..	2	4	29	6	90	21	246	57	161	39	131	23	44	10	..	..	M F	707 162	869
56. Rickets.			..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 2	2
57. Diabetes.			..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	1	1	3	5	9	1	..	..	M F	14 8	22
58. Anaemia, Chlorosis.	a. Pernicious anaemia.		..	1	..	..	1	..	..	1	..	1	..	..	1	1	..	5	4	2	5	3	..	..	..	..	M F	11 14	25
	b. Other anaemias and chlorosis.		..	..	..	..	1	..	..	..	..	..	..	..	4	1	..	3	1	1	..	1	1	..	..	..	M F	7 6	13
59. Diseases of the pituitary gland.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
60. Diseases of the thyroid gland.	a. Exophthalmic goitre.		..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	M F	0 2	2
	b Other diseases of the thyroid gland.	(1) Myxoedema.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Cretinism.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	103	85	30	32	59	53	58	38	36	37	142	50	404	99	994	238	914	198	721	149	336	91	3	..			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

II. General Diseases not included above—*(contd.)*		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward ..	103	85	30	32	59	53	58	38	36	37	142	50	404	99	994	238	914	198	721	149	336	91	3	..			
	(3) Other diseases included under 60b	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
61. Diseases of the parathyroid glands.	(1) Tetany.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases of the parathyroid glands.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
62. Diseases of the thymus.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
63. Diseases of the adrenals.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
64. Diseases of the spleen.		..	..		..	..	1	1	..	..	..	..	..	1	..	2	..	2	..	..	..	..	..	..	..	M F	6 1	7
65. Leukaemia, Lymphadenoma.	a. Leukaemia.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Lymphadenoma.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
66. Alcoholism (acute or chronic).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
67. Chronic poisoning by mineral substances.	(1) Occupational lead poisoning.	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
	(2) Other chronic poisoning by mineral substances.	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
68. Chronic poisoning by organic substances.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	4	..	..	..	..	..	M F	5 0	5
69. Other general diseases.	(1) Purpura.	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
	(2) Haemophilia.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 69.	1	1	4	..	8	1	..	3	..	..	..	..	1	..	..	..	1	1	..	..	..	..	..	..	M F	15 6	21
III. Diseases of the Nervous System and Sense Organs.																												
70. Encephalitis.	(1) Cerebral abscess.	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
	(2) Other diseases included under 70.	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	2 0	2
	Carried forward	104	86	34	33	68	55	59	41	36	37	143	50	406	99	998	238	920	199	726	149	337	91	3	..			

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	104	86	34	33	68	55	59	41	36	37	143	50	406	99	998	238	920	199	726	149	337	91	3	..			
71. Meningitis.			2	..	2	3	2	5	1	2	1	1	..	..	..	..	2	1	5	2	2	..	..	..	..	..	M F	17 14	31
72. Tabes dorsalis (Locomotor ataxy).			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	M F	2 0	.
73. Other diseases of the spinal cord.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	1	..	..	..	..	..	M F	3 0	3
74. Cerebral haemorrhage, Apoplexy, etc.	a. Cerebral haemorrhage.	(1) Cerebral haemorrhage so returned.	2	1	..	..	..	..	..	..	..	..	..	..	1	..	2	..	8	1	15	2	17	16	..	..	M F	45 20	65
		(1) Apoplexy (lesion unstated).	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	4	2	6	7	..	..	M F	14 9	23
	b. Cerebral thrombosis and embolism.	(1) Cerebral embolism.	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	M F	1 1	2
		(2) Cerebral thrombosis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	..	..	M F	2 1	3
75. Paralysis of unstated origin.	a. Hemiplegia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	4	..	5	..	6	4	..	..	M F	16 4	20
	b. Other forms of paralysis.		..	..	..	..	..	2	..	..	..	..	..	..	..	1	1	..	4	2	4	2	2	1	..	..	M F	11 8	19
76. General paralysis of the insane.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	8	..	4	..	1	..	..	..	M F	14 0	14
77. Other forms of insanity.			..	..	..	..	..	..	..	..	..	..	..	..	1	1	4	..	1	..	1	..	..	..	..	..	M F	7 1	8
78. Epilepsy.			..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	0 2	2
79. Convulsions (non puerperal 5 years and over).			..	..	..	..	..	..	3	7	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	3 8	11
80. Infantile convulsions (under 5 years of age).			289	236	237	200	112	97	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	638 533	1,171
81. Chorea.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
82. Hysteria and neuritis.	(1) Hysteria, Neuralgia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(2) Neuritis.		..	..	..	..	..	..	..	..	..	..	..	2	3	6	3	10	3	2	4	3	2	3	..	..	M F	15 26	41
		Carried forward ..	397	323	273	236	182	159	63	51	37	39	143	52	411	108	1,014	250	958	207	766	158	375	123	3	..			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	397	323	273	236	182	159	63	51	37	39	143	52	411	108	1,014	250	958	207	766	158	375	123	3	..			
83. Cerebral softening.			..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	..	2	..	..	..	..	..	M F	5 0	5
84. Other diseases of the nervous system.	(1) Idiocy, Imbecility.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Cerebral tumour.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	(3) Disseminated sclerosis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	M F	0 1	1
	(4) Paralysis agitans.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(5) Other diseases included under 84.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
85. Diseases of the eye and annexa.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
86. Diseases of the ear and mastoid sinus.	(1) Diseases of the mastoid sinus.		..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	M F	1 2	3
	(2) Diseases of the ear.		..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
IV. Diseases of the Circulatory System.																													
87. Pericarditis.			..	..	..	..	..	..	..	..	..	..	1	..	..	..	3	..	2	..	..	..	1	..	..	..	M F	7 0	7
88. Acute endocarditis and myocarditis.	(1) Malignant endocarditis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	M F	1 1	2
	(2) Other acute endocarditis.		..	..	..	..	1	..	..	..	..	..	..	..	4	..	6	..	3	..	..	..	..	..	..	..	M F	14 0	14
	(3) Acute myocarditis.		..	..	..	..	..	..	..	..	..	..	..	..	5	2	18	4	12	2	3	..	..	..	..	..	M F	38 8	46
89. Angina pectoris.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
90. Other diseases of the heart.	(1) Aortic valve disease.		..	..	..	..	..	..	..	2	..	1	..	1	3	..	10	3	24	6	22	6	9	6	..	..	M F	68 25	93
	(2) Mitral valve disease.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	2	2	..	1	..	..	..	M F	4 2	6
	(3) Aortic and mitral valve disease.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0

IV. Diseases of the Circulatory System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	397	323	273	236	183	159	64	53	37	40	145	53	423	111	1,055	258	1,000	218	795	165	387	130	3	..			
	(4) Other or unspecified valve disease.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	5	..	..	2	..	..	M F	7 2	9
	(5) Fatty heart.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(6) Dilatation of heart (cause unspecified)		..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	M F	2 0	2
	(7) Other or unspecified myocardial disease.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	9	5	7	2	..	..	M F	17 7	24
	(8) Disordered action of heart.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(9) Heart disease (undefined).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	2	..	1	..	1	2	..	..	M F	7 2	9
91. Diseases of the arteries.	a. Aneurysm.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	2	..	1	..	2	..	..	..	M F	6 1	7
	b. Arterio-sclerosis.	(1) Arterio sclerosis with record of cerebral vascular lesion.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	5	..	8	2	..	..	M F	14 2	16
		(2) Arterio sclerosis without record of cerebral vascular lesion	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Other diseases of the arteries.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	4	..	1	..	2	1	..	..	M F	9 1	10
92. Embolism and thrombosis (not cerebral).			..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	6	..	2	..	1	..	..	..	..	M F	0 12	12
93. Diseases of the veins (Varix, hæmorrhoids, phlebitis, etc.)			..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	M F	2 0	2
94. Diseases of the lymphatic system.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
95. Hæmorrhage without stated cause.			..	1	..	..	..	..	..	..	1	..	..	..	..	..	1	..	3	..	1	..	..	..	..	..	M F	6 1	7
96. Other diseases of the circulatory system.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
V. Diseases of the Respiratory System.																													
97. Diseases of the nasal fossæ and annexa.	(1) Diseases of the nose.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Diseases of the accessory nasal sinuses.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	397	324	273	236	183	159	64	53	38	40	145	53	424	114	1,066	265	1,012	221	819	171	408	139	3	..			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

V. Diseases of the Respiratory System—*(contd.)*		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward ..	397	324	273	236	183	159	64	53	38	40	145	53	424	114	1,066	265	1,012	221	819	171	408	139	3	..			
98. Diseases of the Larynx.	(1) Laryngismus stridulus.	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	2 0	2
	(2) Laryngitis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases of the larynx.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
99. Bronchitis.	a. Acute bronchitis.	8	3	6	11	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	M F	15 17	32
	b. Chronic bronchitis.	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	2	2	1	7	1	..	..	M F	10 6	16
	c. & d. Bronchitis not distinguished as acute or chronic.	10	10	44	39	27	29	5	..	1	..	..	..	..	..	1	..	2	..	1	..	3	1	..	..	M F	94 79	173
100. Broncho-pneumonia.		56	52	140	126	113	127	42	36	4	5	9	7	9	4	32	6	20	5	9	4	11	6	2	..	M F	447 378	825
101. Pneumonia, lobar, or not otherwise defined.	a. Lobar pneumonia.	5	6	15	8	12	15	4	5	3	4	14	4	48	8	116	15	110	15	94	11	53	5	1	..	M F	475 96	571
	b. Pneumonia not otherwise defined.	6	2	23	15	27	22	11	7	8	11	13	2	20	8	56	15	58	19	51	7	24	5	..	..	M F	297 113	410
102. Pleurisy.	1. Empyema.	..	..	1	..	..	..	..	..	1	..	..	..	1	..	7	..	8	..	3	..	..	..	..	..	M F	21 0	21
	2. Other pleurisy.	..	..	..	..	..	..	..	..	..	..	1	..	1	..	6	..	..	..	..	..	2	..	..	..	M F	10 0	10
103. Congestion and haemorrhagic infarct of lung.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	..	2	..	..	1	..	..	M F	6 2	8
104. Gangrene of the lung.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	1	..	..	..	..	..	M F	4 0	4
105. Asthma.		..	..	..	..	1	..	..	1	..	..	..	..	..	..	1	..	7	2	11	1	7	1	..	..	M F	27 5	32
106. Pulmonary emphysema.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
107. Other diseases of the respiratory system.	a. Chronic interstitial pneumonia including occupational diseases of the lung.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Diseases of the mediastinum.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	Carried forward ..	483	397	502	435	365	354	126	102	55	60	182	66	504	134	1,288	303	1,222	265	993	195	515	161	6	..			

V. Diseases of the Respiratory System—(*contd.*)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	483	397	502	435	365	354	126	102	55	60	182	66	504	134	1,288	303	1,222	265	993	195	515	161	6	..			
	c. Other diseases included under 107.		1	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	4	..	3	..	..	..	..	..	M F	11 0	11
VI. Diseases of the Digestive System.																													
108. Diseases of the buccal cavity and annexa.	(1) Diseases of the teeth and gums.		..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	M F	0 2	2
	(2) Ludwigs angina.		..	1	1	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 1	2
	(3) Other diseases included under 108.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
109. Diseases of the pharynx and tonsils.	(1) Tonsillitis, Adenoid Vegetations.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases included under 109.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	M F	0 1	1
110. Diseases of the oesophagus.			..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
111. Ulcer of the stomach or duodenum.	a. Ulcer of the stomach.		..	..	..	..	..	..	..	..	..	..	1	..	1	..	3	..	8	1	10	..	3	1	..	..	M F	26 2	28
	b. Ulcer of the duodenum.		..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	M F	2 1	3
112. Other diseases of the stomach	1. Inflammation of the stomach.		30	19	32	20	14	8	1	1	..	..	..	..	..	1	..	..	2	..	1	2	2	1	..	..	M F	82 52	134
	2. Other diseases included under 112.		1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	3	..	1	..	1	..	..	..	M F	7 0	7
113. and 114. Diarrhoea and enteritis.	(1) Ulceration of the intestines.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
	(2) Colitis.		2	..	2	4	4	3	1	..	..	..	..	..	..	..	..	3	..	..	1	..	..	.	..	..	M F	10 10	20
	(3) Other diseases included under 113 & 114.		112	66	135	120	74	77	3	3	..	..	1	..	2	1	1	..	2	4	3	1	2	5	..	1	M F	335 278	613
115. Ankylostomiasis.			..	..	..	..	..	1	1	2	3	1	1	..	1	..	3	..	3	..	1	..	..	..	..	..	M F	13 4	17
116. Diseases due to other intestinal parasites.	a. Cestodes, (hydatids of liver excepted).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Trematodes.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	629	483	673	580	457	443	132	108	58	61	185	66	509	137	1,300	306	1,245	270	1,013	200	523	168	6	1			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

VI. Diseases of the Digestive System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	629	483	673	580	457	443	132	108	58	61	185	66	509	137	1,300	306	1,245	270	1,013	200	523	168	6	1			
	c. Nematodes other than Ankylostoma.		..	..	1	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 2	3
	d. Coccidia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	e. Other specified parasites in 116		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	f. Undefined intestinal parasites.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
117. Appendicitis.			..	..	..	..	..	..	2	..	1	..	..	..	1	..	5	..	4	..	1	..	..	..	..	..	M F	14 0	14
118. Hernia, Intestinal obstruction.	a. Hernia.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	3	..	4	..	2	..	1	..	..	..	M F	11 0	11
	b. Intestinal obstruction.		..	..	..	2	..	..	1	..	..	..	..	..	..	1	4	1	2	..	2	..	..	..	..	..	M F	9 4	13
119. Other diseases of the intestiness.	1. Intestinal stasis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other diseases included under 119.		..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	M F	1 2	3
120. Acute yellow atrophy of the liver.			..	..	..	..	..	..	..	..	..	..	1	..	1	1	..	..	..	..	..	..	..	..	..	..	M F	2 1	3
121. Hydatid tumour of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
122. Cirrhosis of the liver.	(a) Returned as alcoholic.		..	..	..	..	..	..	1	..	..	..	..	..	1	..	10	1	12	2	10	1	2	3	..	..	M F	36 7	43
	(b) Not returned as alcoholic.		..	..	1	..	1	..	1	..	..	..	1	..	2	..	6	..	13	1	6	1	1	2	..	..	M F	32 4	36
123. Biliary Calculi.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	1	..	..	M F	2 1	3
124. Other diseases of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	4	..	5	1	5	1	9	..	1	..	..	..	M F	24 2	26
125. Diseases of the pancreas.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	M F	4 0	4
126. Peritonitis without stated cause.			1	..	..	..	..	..	1	..	..	..	..	1	4	2	13	5	9	..	13	1	4	..	..	..	M F	45 9	54
		Carried forward ..	630	483	675	582	458	446	138	108	59	61	187	67	523	141	1,347	314	1,300	275	1,056	203	532	174	6	1			

VI. Diseases of the Digestive System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	630	483	675	582	458	446	138	108	59	61	187	67	523	141	1,347	314	1,300	275	1,056	203	532	174	6	1			
127. Other diseases of the digestive system.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa.																													
128. Acute nephritis. (Including unspecified under 10 years of age).			1	..	2	5	11	8	8	9	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	24 22	46
129. Chronic nephritis. (Including unspecified over 10 years of age).			..	..	..	..	..	..	..	..	4	4	9	9	13	11	35	34	54	28	102	28	122	46	..	..	M F	339 160	499
130. Chyluria.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
131. Other diseases of the kidney and annexa.			..	..	..	..	1	..	..	..	..	..	1	2	1	1	5	1	4	..	6	..	2	1	..	..	M F	20 5	25
132. Calculi of the urinary passages.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
133. Diseases of the bladder.	1. Cystitis.		..	..	..	..	..	1	..	..	..	..	1	..	..	..	4	..	3	..	..	1	1	1	..	..	M F	9 3	12
	2. Other diseases of the bladder.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
134. Diseases of the urethra, urinary abscess, etc.	a. Stricture of the urethra, etc.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Other diseases of the urethra.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
135. Diseases of the prostate.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	M F	3 0	3
136. Non-venereal diseases of the male genital organs.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
137. Cysts, and other tumours of the ovary not returned as malignant.			..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	M F	0 2	2
138. Salpingitis and pelvic abscess in females.	1. Salpingitis.		..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	M F	0 2	2
	2. Pelvic abscess in females.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
139. Tumours of the uterus not returned as malignant.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	0 1	1
140. Non-puerperal uterine-haemorrhage.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
		Carried forward ..	631	483	677	587	470	455	146	117	63	65	199	79	538	155	1,391	350	1,361	306	1,164	232	662	222	6	1			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa—*(contd.)*																													
		Brought forward ..	631	483	677	587	470	455	146	117	63	65	199	79	538	155	1,391	350	1,361	306	1,164	232	662	222	6	1			
141.	Other diseases of the female genital organs.	1. Other diseases of the uterus.	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
		2. Diseases of the female genital organs not included under other headings.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
142.	Non-puerperal diseases of the breast.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	0 1	1
VIII. The Puerperal State.																													
143.	Accidents of pregnancy.	a. Abortion.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	M F	0 2	2
		b. Ectopic gestation.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1	..	..	..	..	M F	0 3	3
		c. Other accidents of pregnancy.	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	3	..	1	..	1	..	..	..	..	M F	0 6	6
144.	Puerperal Hæmorrhage.		..	..	..	..	..	..	..	..	..	..	..	2	..	2	..	8	..	1	..	..	..	..	..	..	M F	0 13	13
145.	Other accidents of childbirth.		..	..	..	..	..	..	..	..	..	..	..	2	..	2	..	7	..	11	..	..	..	..	..	..	M F	0 22	22
146.	Puerperal sepsis.		..	..	..	..	..	..	..	..	..	..	..	2	..	6	..	3	..	1	..	..	..	..	..	..	M F	0 12	12
147.	Puerperal phlegmasia alba dolens, embolism and sudden death.	1. Puerperal phlegmasia alba dolens not returned as septic.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	0 1	1
		2. Puerperal embolism and sudden death.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
148.	Puerperal albuminuria and convulsions.		..	..	..	..	..	..	..	..	..	..	..	1	..	3	..	5	..	1	..	1	..	..	..	..	M F	0 11	11
149.	Childbirth not assignable to other headings (puerperal insanity).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
150.	Puerperal diseases of the breast.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
IX. Diseases of the Skin and Cellular Tissue.																													
151.	Gangrene.	1. Senile gangrene. (aged 60 and over).	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	M F	2 0	2
		2. Other gangrene.	..	..	..	1	..	3	1	..	2	..	..	..	..	..	3	..	3	..	2	..	..	..	..	..	M F	11 4	15
152.	Carbuncle, boil.		2	..	7	1	1	..	..	..	..	..	..	..	..	..	1	1	..	..	..	1	1	2	..	..	M	12 5	17

IX. Diseases of the Skin and Cellular Tissue—*(contd.)*

			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	633	483	684	589	471	458	147	117	65	65	199	87	538	169	1,395	381	1,364	322	1,166	236	665	225	6	1			
153.	Cellulitis, acute abscess.	1. Cellulitis.	..	2	4	2	..	..	..	..	..	1	..	..	1	..	2	..	1	..	..	1	..	..	..	..	M F	8 6	14
		2. Acute abscess.	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	M F	1 2	3
154.	Other diseases of the skin and its annexa.	1. Uucer, bedsore.	..	..	1	..	..	..	..	..	..	..	..	1	..	..	2	..	2	..	2	..	..	..	..	..	M F	7 1	8
		2. Eczema.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		3. Pemphigus.	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
		4. Other diseases included under 154.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	X. Diseases of the Bones and Organs of Locomotion.																												
155.	Diseases of the Bones.	1. Acute infective osteomyelitis and periostitis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		2. Other diseases of the bones.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
156.	Diseases of the joints.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	1	..	..	..	..	M F	2 1	3
157.	Amputation.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
158.	Other diseases of the organs of locomotion.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	XI. Congenital Malformations.																												
159.	Congenital malformations.	1. Congenital hydrocephalus.	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
		2. Congenital malformation of heart	2	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	2 2	4
		3. Other congenital malformations.	5	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	5 3	8
	XII. Diseases of Early Infancy.																												
160.	Congenital debility, sclerema and iceterus.	1. Congenital debility and sclerema.	82	62	15	25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	97 87	184
		2. Icterus neonatorum.	3	6	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	5 7	12
161.	Premature birth, injury at birth.	1. Premature birth.	186	200	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	186 200	386
		Carried forward ..	911	757	706	618	473	459	147	117	65	66	199	88	540	169	1,401	382	1,367	322	1,169	238	665	225	6	1			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

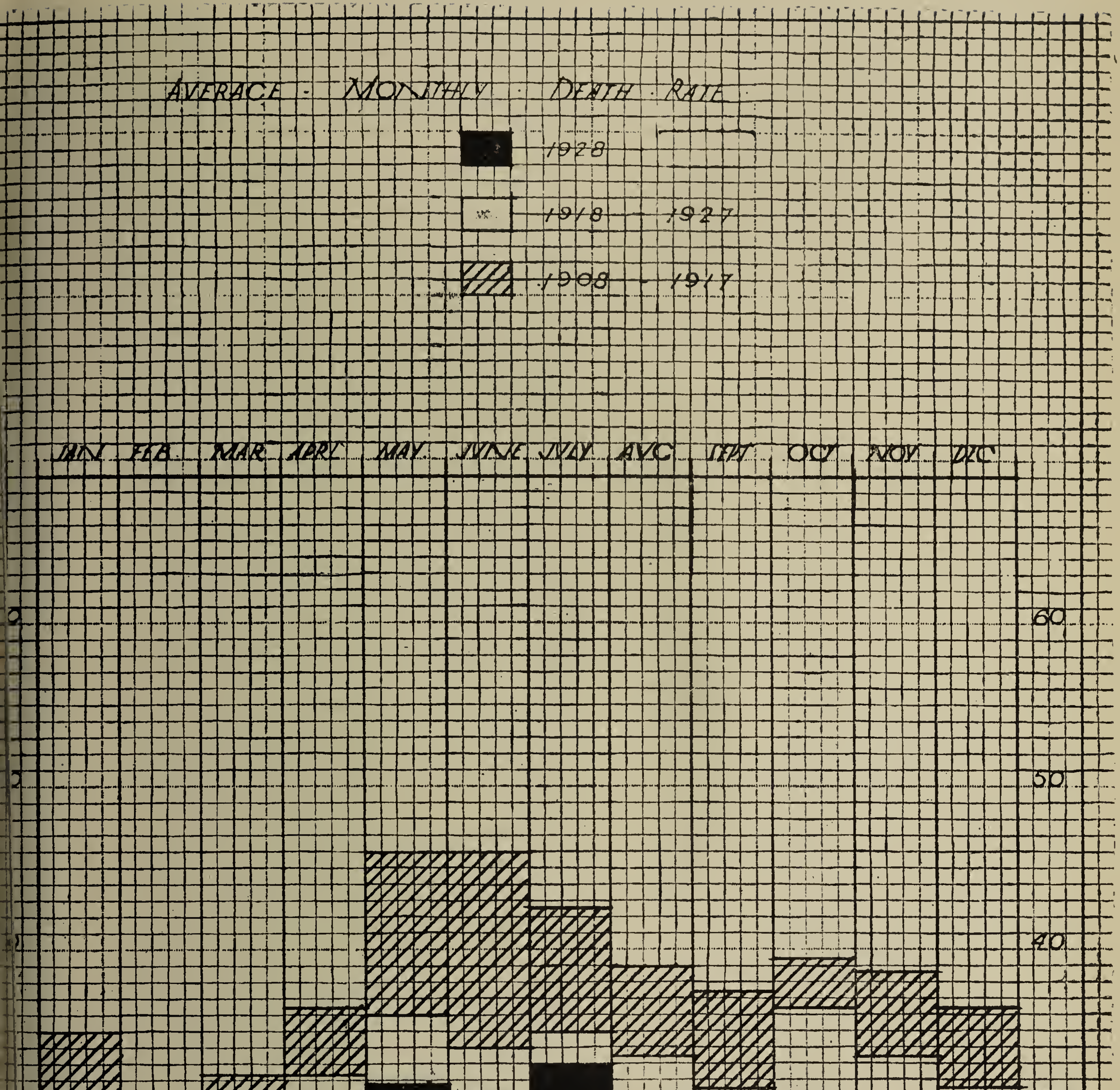
XII. Diseases of Early Infancy—*(contd.)*		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward ..	911	757	706	618	473	459	147	117	65	66	199	88	540	169	1,401	382	1,367	322	1,169	238	665	225	6	1			
	2. Injury at birth.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
162. Other diseases peculiar to early infancy.	1. Diseases of the umbilicus.	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	2 0	2
	2. Atelectasis.	12	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	12 10	22
	3. Other diseases included under 162.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
163. Lack of care.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
XIII. Old Age.																												
164. Old age.	1. Senile dementia.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other forms of senile decay.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	8	255	220	..	..	M F	257 229	486
XIV. External Causes.																												
165. & 166. Suicide by solid or liquid poisons and corrosive substances.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
167. Suicide by poisonous gas.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
168. Suicide by hanging or strangulation.		..	..	..	..	..	..	..	..	..	..	1	..	2	1	14	3	12	1	11	..	2	2	1	..	M F	43 7	50
169. Suicide by drowning.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
170. Suicide by firearms.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
171. Suicide by cutting or piercing instruments.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	2	..	..	..	..	..	..	..	M F	5 1	6
172. Suicide by jumping from high place.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
173. Suicide by crushing.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
174. Suicide by other means.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
175. Food poisoning.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	0 1	1

XIV. External Causes—(contd.)	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
Brought forward ..	925	766	706	618	473	459	147	117	65	66	200	88	542	170	1,418	387	1,383	324	1,182	246	922	448	7	1			
176. Poisoning by venomous animals.	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
177. Other acute accidental poisoning (not by gas).	..	..	..	..	..	..	..	..	..	..	..	1	1	1	2	1	..	1	1	1	..	..	..	..	M F	4 5	9
178. Conflagration.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
179. Accidental burns (conflagration excepted).	1	..	..	..	1	1	2	2	1	1	1	..	1	..	4	..	..	..	1	..	..	..	..	..	M F	12 4	16
180. Accidental mechanical suffocation.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
181. Accidental absorption of irrespirable or poisonous gas.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
182. Accidental drowning.	..	..	..	..	..	2	..	1	1	..	..	..	5	..	4	..	..	..	1	..	..	..	..	..	M F	11 3	14
183. Accidental injury by firearms.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
184. Accidental injury by cutting or piercing instruments.	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
185. Accidental injury by fall.	..	..	..	..	..	..	..	..	2	..	..	..	3	..	4	..	..	..	1	..	2	..	..	..	M F	12 0	12
186. Accidental injury in mining and quarrying.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
187. Accidental injury by machinery.	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
188. Accidental injury by other forms of crushing (road vehicles on railways, &c.)	..	..	..	..	..	..	..	1	2	2	2	1	3	..	9	..	5	1	7	1	3	..	1	..	M F	32 6	38
189. Injury by animals (poisoning by venomous animals excepted).	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
190. Wounds of war.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
191. Execution of civilians by belligerent armies.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
192. Hunger or thirst.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
Carried forward ..	926	766	706	618	474	462	149	121	71	69	204	90	558	171	1,441	388	1,388	326	1,193	248	927	448	8	1			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1928.

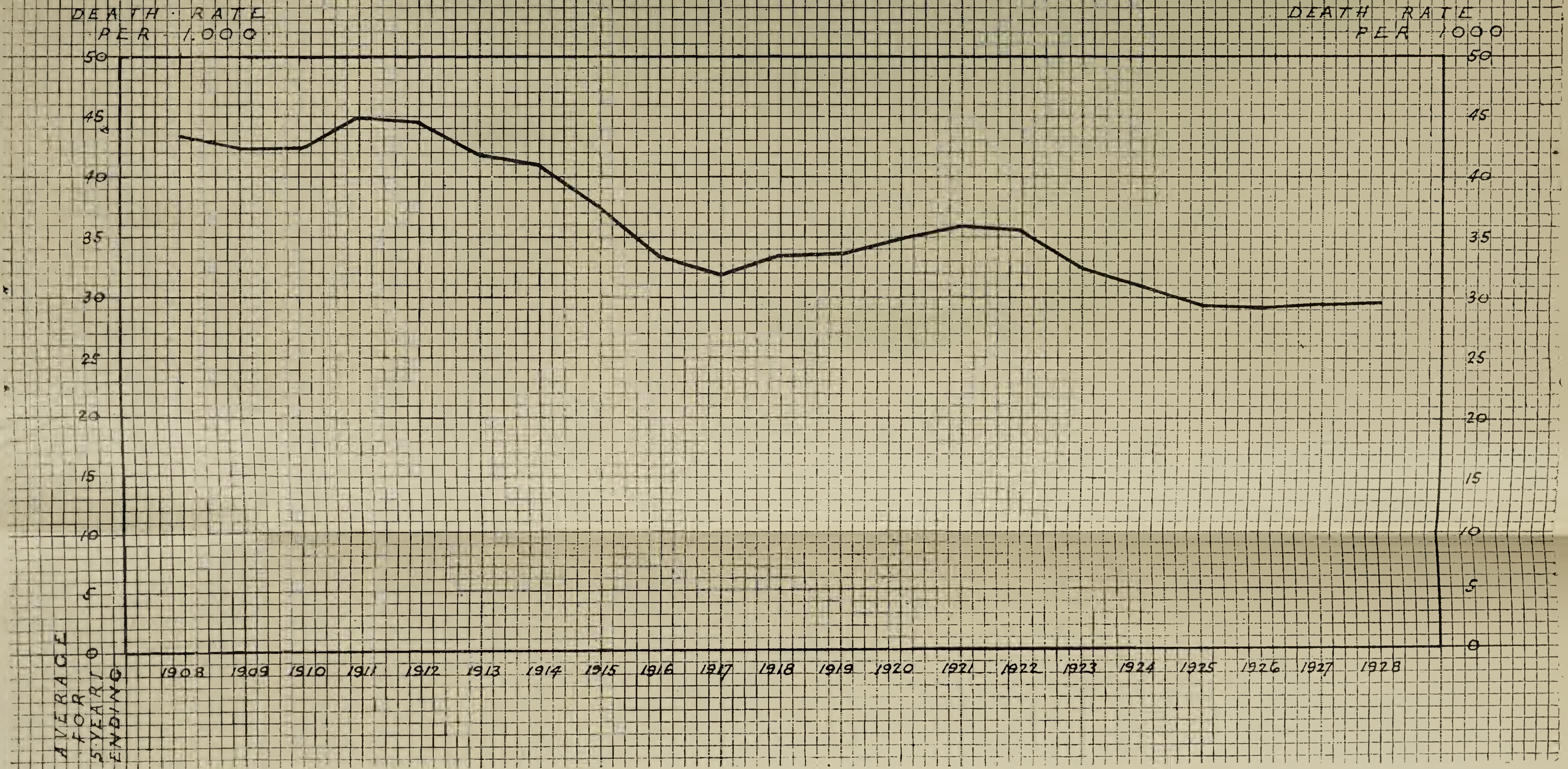
XIV. External Causes—(contd.)

				Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
			Brought forward ..	926	766	706	618	474	462	149	121	71	69	204	90	558	171	1,441	388	1,388	326	1,193	248	927	448	8	1			
193.	Excessive cold.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
194.	Excessive heat.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
195.	Lightning.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
196.	Electricity (Lightning expected).			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
197.	Homicide by firearms.			..	..	..	..	..	..	..	..	..	..	..	..	2	..	4	..	4	..	..	..	..	..	..	..	M F	10 0	10
198.	Homicide by cutting or piercing instruments.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	14	1	5	..	1	..	..	..	..	..	M F	20 1	21
199.	Homicide by other means.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
200.	Infanticide (under one year).			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
201.	Fracture (cause not specified)			..	..	..	..	..	..	2	3	5	1	3	..	4	1	23	1	27	..	10	..	2	3	..	..	M F	76 9	85
202.	Other and unstated forms of accidental violence, Execution.			..	..	..	..	1	..	..	..	..	..	..	..	1	..	6	1	4	1	1	..	..	1	..	..	M F	13 3	16
203.	Violent deaths of unstated nature (*i.e.* accidental, suicidal &c.) and cause.			..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
	XV. Ill Defined Diseases.																													
204.	Sudden death.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
205.	Cause of death unstated or ill-defined.	1. Heart failure (age 1—70).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	1	1	..	..	3	..	..	..	M F	6 3	9
		2. Other ill-defined causes.		18	14	55	33	62	80	8	12	7	6	14	9	29	5	54	21	61	26	73	18	40	10	1	..	M F	422 234	656
		3. Cause not specified.		..	4	1	1	3	1	2	..	..	..	..	..	1	..	2	1	6	..	..	..	1	..	9	1	M F	25 8	33
			Total ..	944	784	762	652	540	543	161	136	83	76	222	99	595	177	1,546	415	1,496	354	1,278	266	973	462	18	2	M F	8,618 3,966	12,584
				1,72		1,414		1,083		297		159		321		772		1,961		1,850		1,544		1,435		20				


AVERAGE · MONTHLY · DEATH RATE
1928
1918 – 1927
1908 – 1917
JAN
FEB
MAR
APRL
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC
60
50
40
30
20
10
0

DEATH · RATE ·

GRAPH · SHOWING · THE · TREND · (MOVING · AVERAGE · 5 · YEAR · GROUPING
OF · DEATH · RATE · IN · SINGAPORE · PER · 1,000 · POPULATION



MORTALITY ACCORDING TO NATIONALITIES AND AGES.

The following return shows the number of deaths at different age periods in the different nationalities.

	Sex.	Under 3 months.	3—12 months.	1—5 years.	5—10	10—20	20—25	25—35	35—45	45—55	Over 55	Unknown	Total	
Europeans	M	3	1	2	—	—	5	5	12	9	9	—	46	60
	F	3	—	1	—	—	1	3	—	1	5	—	14	
Eurasians	M	8	6	4	1	1	1	3	7	5	13	—	49	97
	F	4	6	6	—	3	3	4	3	7	12	—	48	
Chinese	M	746	636	451	137	235	486	1,235	1,279	1,144	804	16	7,169	10,304
	F	635	534	437	118	132	133	310	278	211	345	2	3,135	
Malays	M	141	92	52	14	26	22	72	60	44	80	—	603	1,093
	F	108	86	53	10	20	21	57	43	25	67	—	490	
Indians	M	44	25	25	8	37	79	221	129	71	52	2	693	937
	F	31	24	43	7	19	17	36	25	16	26	—	244	
Others	M	2	2	6	1	6	2	10	9	5	15	—	58	93
	F	3	2	3	1	1	2	5	5	6	7	—	35	
Total	M	944	762	540	161	305	595	1,546	1,496	1,278	973	18	8,618	12,584
	F	784	652	543	136	175	177	415	354	266	462	2	3,966	
Grand Total		1,728	1,414	1,083	297	480	772	1,961	1,850	1,544	1,435	20		12,584

The six chief causes of death for the last five years were:—

	1924	1925	1926	1927	1928
Pneumonia ..	1,262	1,481	1,843	2,291	1,806
Tuberculosis ..	1,276	1,254	1,370	1,523	1,411
Convulsions ..	839	877	1,114	1,405	1,171
Malaria ..	848	962	1,600	1,287	1,196
Beri Beri ..	678	740	798	1,078	869
Dysentery ..	576	605	657	699	482

GENERAL DEATH RATE.

As already stated the crude death rate was 28.44 per 1,000 living as compared with 33.08 in the previous year. Though not the lowest recorded this may be taken as very satisfactory, and shows a welcome decrease on the average of the past ten years which was 32.32. The progressive fall which has taken place in the last 20 years is well shown in Charts I and II. Chart II gives the average monthly death rates for the decades 1908-1917 and 1918-1927 and the monthly death rate for the year under review. It will be seen that in addition to a fall in the annual death rate, there has been a steady fall in the average monthly death rate for each month of the year. Chart II also brings out well the great decrease in malarial deaths, the high wave in the decade 1908–1917 in the months May, June and July being flattened out in later years.

I have described the death rate as being satisfactory but in my opinion it is even more satisfactory than it appears on the surface, as I am confident that many deaths are referred to Singapore which should not really be classified as Singapore deaths. Hitherto it has been the custom to make only one correction of the death rate i.e. to discount the deaths of those who had been resident for less than three months. Incidentally that correction for 1928 makes the death rate 26.96. At home, however, where persons and their recent movements are more easily recorded and traced it is usual, when reckoning the death rate of any particular town, to discount all "external" deaths. Here in Singapore this would be impossible with any degree of exactitude as it is so difficult to obtain reliable information. At the same time there is no harm in a little speculation. From my observations I have always been fairly satisfied that Singapore town is a clearing house for the Federated Malay States and the adjoining islands. Coolies in the last stages of severe illness, and no longer fit for active employment, are continually drifting into Singapore. They are driven here by force of circumstances. It may be to seek free medical relief, but more often it is, I imagine, the spectre of starvation and the hope of finding friends to help them that urge them to Singapore. Most of them gravitate finally to the free wards of our hospitals often too late, I am afraid, for medical help to be of value.

With the idea of trying one day to prove this, I have, through the courtesy of the P. C. M. O., during the past two years been supplied with regular returns of admissions for malaria to the third class wards of the General Hospital and the wards of Tan Tock Seng. Though much of the information so obtained, especially with regard to the home addresses of the patients, is not too reliable, yet an analysis of the returns gives some quite definite information. During the year the two hospitals recorded 3438 admissions for malaria. I divided these into five classes according to the addresses given and the chances of malaria having been contracted there, as judged by our knowledge of what mosquito breeding was taking place in the vicinity. The analysis worked out as follows:—

Probable	499
Possible	107
Impossible	1,321
Outside Municipal Limits	986
Insufficient address	525
	3,438

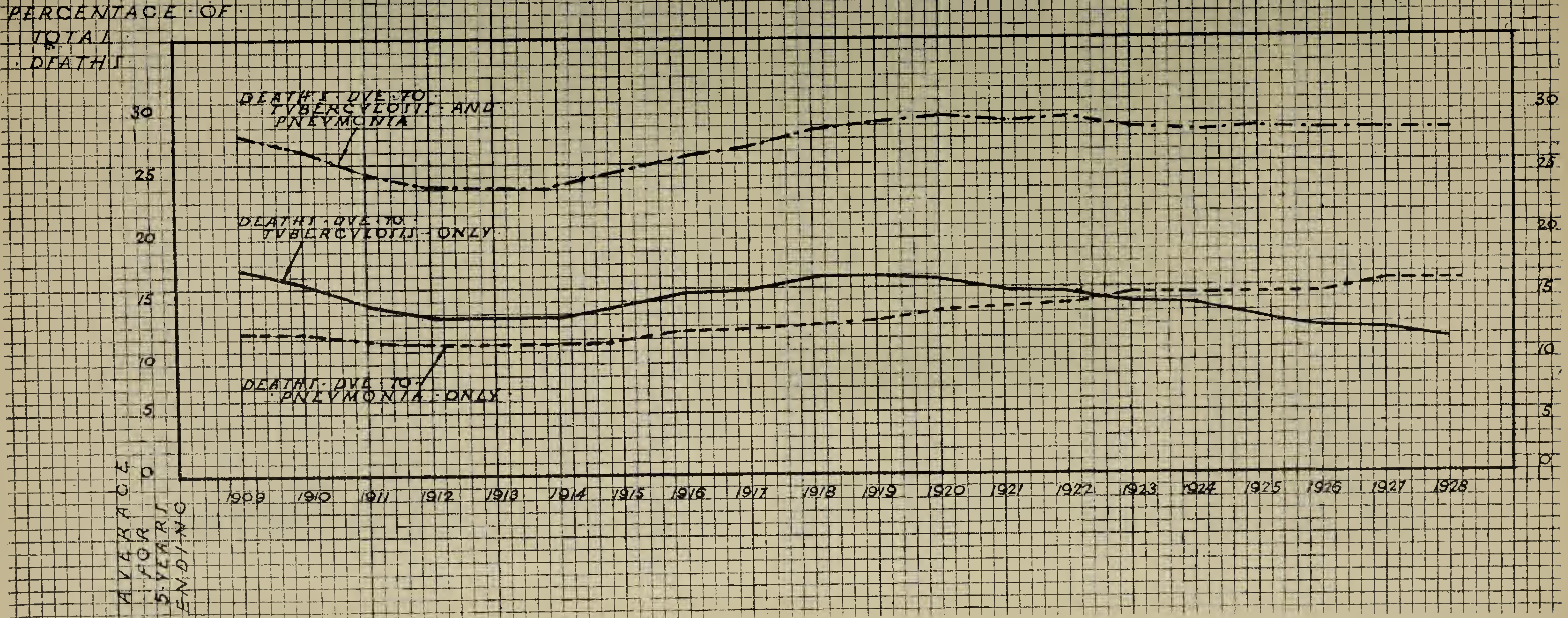
The "impossible" and "outside municipal limits" taken together give a total of 2,307 or 67%.

As a further check on the "impossible" figures these results were further specially examined by a visit to many of the addresses given. For instance 67 cases gave an address in Bali Lane, in the vicinity of which no Anopheline could breed. Inspection of these houses revealed something of what one naturally expected. Many of the houses in that street are occupied as to ground floor by traders, while the upper floors house coolies. The traders are mostly engaged in trading between Singapore and the Dutch islands while the coolies are employed on the boats. Sometimes these coolies are away for a week at a time. In no case could a history of malaria be obtained in the case of permanent residents of the houses.

Similarly many of the other "impossible" houses were found to be lodging houses..

TVBERCVLOSIS · AND · PNEVMONIA

GRAPH · SHEWING · THE · TREND · OF · PERCENTAGE · OF · TOTAL · DEATHS · DVE
TO · TVBERCVLOSIS · AND · PNEVMONIA
(INCLVDING · BRONCHITIS)



Even in the "probable" areas I am confident that much of the malaria is really imported. For instance during the year 11 cases gave the same address in Lorong 23. Enquiry at that house elicited the fact that it is a sort of clearing house for Chinese ricksha pullers going to and coming from China. Of the half dozen Chinese coolies who had been in permanent residence for over two years none gave a history of malaria.

The same is more or less true with other "probable" areas, notably Jalan Besar district from which many cases were reported. But even here most of the addresses were confined to two streets and many on examination were found to be lodging houses.

We may safely assume then I think, from the analysis of these cases that certainly 67% of them contracted their malaria outside. But I would go even further. I am quite confident in stating that I think not 10% of the recorded cases contracted malaria inside municipal limits.

Turning now to the recorded deaths from Malaria, there were 1,196 of these during the year. I propose, reasonably I think, to apply to these the figures obtained from the analysis of the cases of malaria. Taking the 67% figure we could then place 800 of the deaths as "external" deaths. Taking the other figure i.e. that not more than 10% of the cases contracted malaria in Singapore then it follows that not more than 120 of the deaths should be assigned to Singapore. And I am reasonably confident this is nearer the truth.

Further with regard to the deaths from other causes, though I have no facts or figures in proof, I think we might reasonably infer that many of the 482 Dysentery deaths, the 869 Beri Beri deaths and the 486 deaths from old age, could, in similar manner, be assumed to be external deaths.

I have no purpose in my speculations above other than to suggest that Singapore is probably a very much healthier place than is generally supposed. In common with other large Eastern cities it has to pay the penalty of its size and geographical position by being made to shoulder the responsibility for the failure, shall we say, of hygienic measures elsewhere. If I succeed only in removing to some extent the wrong impression created by the unfavourable and unfair remarks made about us at home, and in instilling into those concerned with the formulation and enforcement of health measures in this town a spirit of hopefulness, the time and thought expended on these speculations will not have been wasted.

With reference to other chief causes of death, Tuberculosis accounted for 1,411 (phthisis 1,313) and the Pheumonias for 1,806. The two together accounted for roughly 25% of all the deaths. In connection with this Chart III is of interest. It shows the trend of Tuberculosis and Pneumonia (including Bronchitis) mortality for the past 20 years. It will be seen that the Tuberculosis rate has tended to decrease while the Pneumonia rate has increased. Too much importance should not be given to this as it may only mean improved certification. The outstanding feature of the graph is that the two causes taken together show practically no improvement in the 20 years. I have said enough anent these two diseases in previous reports and I do not propose to enlarge any further. We know the cause and the remedy. All experience elsewhere goes to prove that the provision of sanitary housing is the only real and lasting cure. And that is in the hands of the Improvement Trust. During the year under review that body has been particularly busy and several of its schemes are approaching completion. Great expectations are held of the Tiong Bahru scheme which, it is hoped, will one day be the nucleus of a new and sanitary Chinatown. The preliminary part of the work in connection with this scheme is well under way.

The great thing is that we now recognise the evil and its causes and our minds are set in the right direction for their eradication. At the same time lest any are still doubtful as to the necessity for cleaning up our slums there is no harm in drawing their attention to a comparison between the number of deaths from these causes in Singapore and the number dying of the same diseases in England and Wales, where the climatic conditions are so much more favourable to their spread. Such comparison may be seen in Table A.

Out of every 1,000 deaths in Singapore Phthisis was responsible for 104 and the Pneumonias for 143. The corresponding figures for England and Wales were 66 and 71.

Beri Beri is reported to have caused 869 deaths. I must confess I find this somewhat difficult to believe but as only 257 were so certified by the Inspecting Officers i.e. on a view only, we must accept the diagnosis as being correct.

In conclusion and as a matter of general interest only I put up Table A, already referred to, which gives a comparison of the principal causes of Death in England and Wales during 1926 (the latest year available) and in Singapore during 1928.

Reference has already been made to Pneumonias and Phthisis. With figures 143 and 104 they occupy first and third positions in the Singapore list, in the home list the fourth and sixth.

In the home list Heart Disease takes the first place with 142 with Cancer a close and closing second with 117. The same two diseases in the Singapore list show 16 and 11 or about one tenth each respectively. There is food for much thought, and speculation in these last figures.

No. 20 in the table is also interesting. In Singapore "other causes" accounted for 328 as against 76 for England and Wales. Though doubtless many of the 328 might with better facilities for more exact certification be referred elsewhere, yet the first three diseases, essentially tropical, accounted for 202.

INFANTILE DEATH RATE.

The infantile death rate was 202.1 per 1,000 compared with 227.6 in 1927 and 232 in 1926. It is the lowest yet recorded.

CORRECTED INFANTILE DEATH RATE.

From figures supplied by the Chinese Protectorate we learn that during the year 6,722 infants under one year of age were brought into the Colony. Of these 3,551 were reported as remaining here. If these are added to the births during the year then the infantile mortality rate falls to 164.5. The corresponding figure for last year was 180.9 and in 1926 it was 185.

In connection with Infantile Mortality, Chart IV. is of interest. It show the continuous downward trend of the infantile mortality rate for the past 20 years. There has been a steady fall since 1911. Curiously

TABLE A.

Comparison of Principal Causes of Death in England and Wales (1926 and Singapore 1928).

CAUSE OF DEATH	ENGLAND & WALES		SINGAPORE	
	Number of deaths	Proportion per 1,000 deaths	Number of deaths	Proportion per 1,000 deaths
1. Measles	3,483	8	5	1
2. Whooping Cough	4,118	9	1	—
3. Diphtheria	2,994	7	8	1
4. Influenza	8,936	20	62	5
5. Tuberculosis of respiratory system	30,108	66	1,313	104
6. Other forms of tuberculosis	7,417	16	98	8
7. Cancer—Malignant disease	53,220	117	144	11
8. Diseases of nervous system and sense organs	46,569	103	1,430	114
9. Diseases of the heart	64,465	142	204	16
10. Other diseases of the circulatory system	20,739	46	54	4
11. Bronchitis	30,187	67	221	18
12. Pneumonia (all forms)	32,339	71	1,806	143
13. Other diseases of respiratory system	5,303	12	90	7
14. Diarrhoea and Enteritis	8,415	19	634	50
15. Other diseases of digestive system	19,234	42	408	32
16. Non Venereal diseases of genito urinary system	19,083	42	596	47
17. Premature birth and diseases of early infancy	19,012	42	619	49
18. Old Age	24,564	54	486	39
19. Violence	18,620	41	285	23
20. Other Causes:—				
Malaria	—	—	1,196	95
Beri Beri	—	—	869	69
Dysentery	—	—	482	38
Syphilis	34,998	76	271	21
Tetanus	—	—	146	12
Enteric Fever	—	—	137	11
Ill defined causes	—	—	698	56
Other causes	—	—	321	26
	453,804	1,000	12,584	1,000

enough that was the year when a nurse was first appointed to supervise the work of the local midwives. From that small beginning our present Infant Welfare branch has gradually grown to its present proportions wherein are employed six sisters and 14 Health Visitors. Reference should be made to the special report on the work of the nurses and Clinics to obtain an idea of the amount of work they get through. The Commissioners lately agreed to the appointment of a full time Lady Medical Officer with special experience in Infant Welfare, to take charge of this important work. I think they may rest assured that what they have already expended and propose to expend on this branch of the department is and will be well spent as I think there can now be no doubt in the minds of any, but that this great saving of infant life of almost 150 per 1,000 infants born (which last year meant in round figures a saving of 2,200 lives) which has taken place in the last 20 years is to a great extent due to the work of the Midwives and Infant Welfare Branch.

It should be noted that this saving of life has taken place in the face of a steadily rising birth rate which is as a rule associated with a rising mortality rate, and in spite of the fact that the conditions of life in which and into which these babies are born are but slowly improving.

CERTIFICATION OF DEATHS.

The following return shows the numbers of deaths the causes of which were certified by Medicalmen, the Coroner, and the Inspecting Registrars respectively:—

	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
Registrars ..	1	8	2,711	704	201	9	3,634
Medicalmen ..	48	85	6,960	367	658	79	8,197
Coroner ..	11	4	633	22	78	5	753
Total ..	60	97	10,304	1,093	937	93	12,584

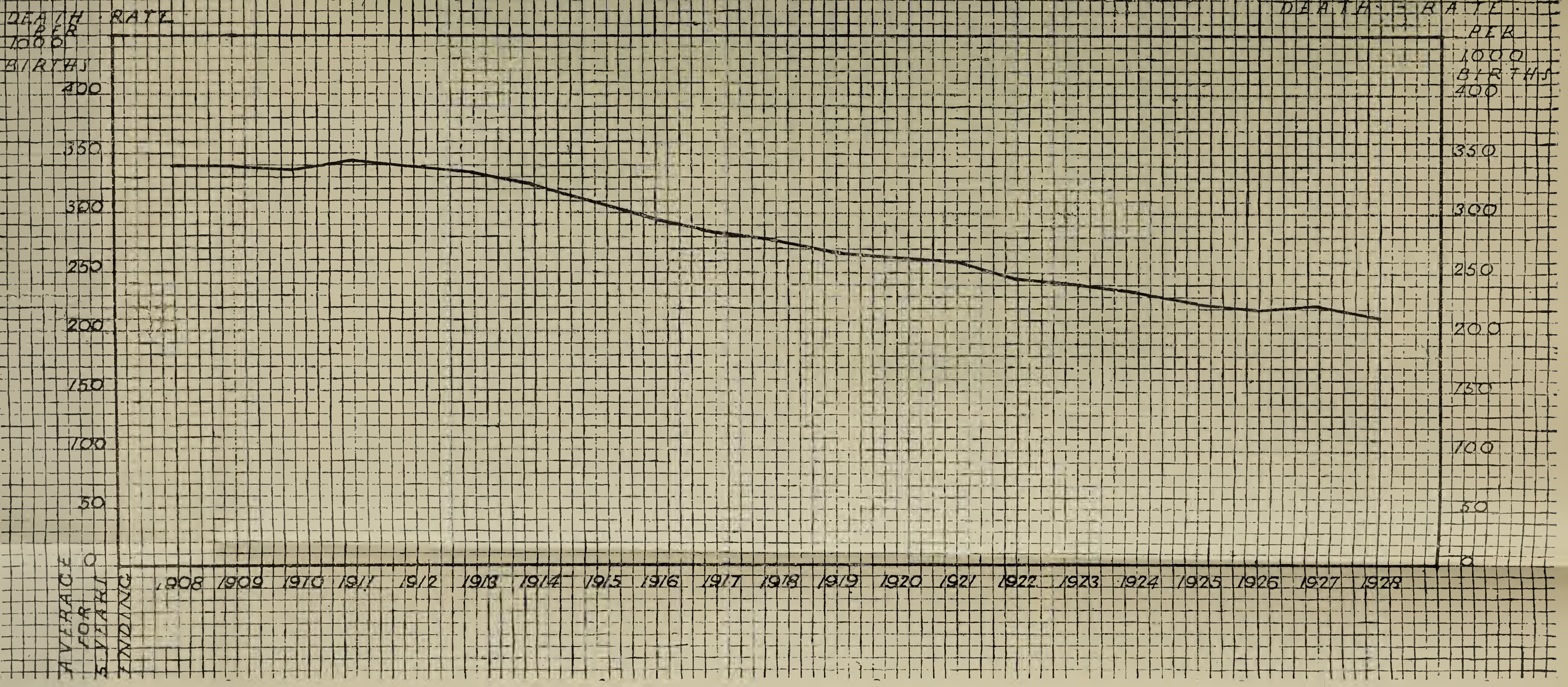
This gives a percentage of 28.9 certified by Registrars as against 30.1 last year, 65.1 by Medicalmen as against 63.6 last year and 5.98 certified by the Coroner as against 6.2 last year.

The percentages for the last 10 years have been as follows:—

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
Registrars ..	39.9	36.8	36.1	35.1	37.3	35.0	33.9	34.1	30.1	28.9
Medicalmen ..	55.2	58.1	58.3	58.2	55.4	58.5	58.7	59.6	63.6	65.1
Coroner ..	4.8	5.0	5.4	6.5	7.1	6.3	7.2	6.2	6.2	5.98

INFANTILE MORTALITY

GRAPH SHEWING THE TREND (MOVING AVERAGE 5 YEAR GROUPING) OF INFANTILE DEATH RATE IN SINGAPORE PER 1000 BIRTHS



V. REGISTRATION OF BIRTHS AND DEATHS.

The numbers registered at the different offices were as follows:—

	Births	Deaths
Central Office ..	1,392	3,392
Prinsep Street Office ..	8,629	5,568
Kreta Ayer Office ..	5,519	3,624
	15,540	12,584

Twenty four births were registered in the Post Registration Books and the sum of $290 was received in late registration fees.

VI. ANALYTICAL LABORATORY.

The number of samples analysed was 15,607. Full details of these will be found in the Analyst's report which is appended.

Municipal Water Supply.—Samples were examined daily from all points in the system the total number being 11,079. As judged by the analyses of the tap samples water of a very high standard of purity was delivered to consumers throughout the year.

Except for a very short interval at Woodleigh when chlorination was stopped, all the water delivered to the town was filtered and chlorinated. No taste troubles were reported.

Well Waters.—179 samples were examined and all were condemned.

Municipal Sewage Works.—3,151 samples were analysed. There is nothing special to report with regard to these except to say that both the Coral and the Granite percolating filters, when not over loaded, continue to give an effluent of a high standard. Experiments were continued with the Bio Aeration unit. On occasion it gave a very good effluent but only for a short period and at low rates. It would suddenly fall away for no apparent reason though evidence is accumulating which may go to show that it is adversely affected by an excess of chlorides. It was found from special experiments that the amount of chlorides in the Sewers varies within very wide limits during the twenty four hours and it would appear that there must be quite a large infiltration of brackish water through defective Sewers.

Private Sewage Installations.—190 samples were examined. Results confirmed our experience of previous years i.e. that when these small plants are properly looked after and maintained they are capable of giving a very pure effluent. It is hoped that the maintenance and control of these plants will soon be taken over by the Sanitary Engineers department. In the meantime they are maintained privately, and, in many cases, but indifferently.

Milk Supply.—107 samples of fresh milk were examined and 51% were found to be adulterated.

Other food samples included tinned and reconstituted milks, tea, coffee and aerated waters, while a large number of examinations of a special nature was carried out for the various engineering departments.

VII. BACTERIOLOGICAL LABORATORY.

Dr. Gilmour's report is appended.

Public Health Examinations.—8,622 specimens were examined. This is a decrease on last year's figure but it is due to the smaller number of rats examined consequent on the cessation of systematic trapping. Actually if rats are discounted, there was an increase of 855 specimens.

Water.—9,059 routine samples from various points in the municipal system were examined. Over the whole year a high standard of purity in the filtered supply was maintained.

Despite the heavy routine work of the department Dr. Gilmour found the time to carry out several little pieces of research. The results of this work on sludge and the Bacteriophage are particularly interesting and those interested are rcommended to read his report.

Mortuary.—15 autopsies were performed. Only 4 were cases of dangerous infectious disease, 2 being cholera and 2 plague.

VIII. ANTI MOSQUITO WORK.

Details of the work of this branch of the department will be found in Dr. Dawson's report which is appended.

New Works.—New work was carried out in 24 areas scattered all over the town. It should be understood that in these new works the object aimed at is not antimalarial only, but to destroy all breeding grounds.

In those areas 5,229 yards of subsoil pipes were put down, 3,238 yards of concrete channel drains of antimalarial type were constructed while 7,062 yards of main open earth ditches were cut.

Existing areas.—Extensions and repairs in existing areas involved the putting down of 3,312 yards of subsoil pipes, and 2,431 yards of channels which latter replaced 2,396 yards of existing main ditches. New ditches to the extent of 666 yards were cut. In addition 1,869 yards of tidal bund were raised two feet in height and four in width, while another bund of 820 yards, also in the Geylang Basin, was raised one foot in height and four in width. Three tidal gates were constructed while 904 ponds and wells were filled in and levelled off.

At the end of the year there had been completed and put in permanent maintenance approximately 52 miles of subsoil pipes, 21½ miles of channels and 22¾ miles of main open ditches.

The total amount spent on Anti Mosquito work during the year was $134,888 or approximately 30½ cents per annum per head of the estimated population. This figure includes all overhead charges.

During the year 5 gangs of 20 men were permanently employed in maintaining the completed areas, 2 gangs in Patrol work, 3 gangs in new work in small areas and 6 gangs in works of larger magnitude.

Throughout the year too, an average of 6 masons was constantly employed. In addition to their regular work, that of carrying out all repairs, they manufactured many of the concrete inverts used by the department and in addition they constructed 3,458 yards of the new concrete channels. The rest of the channelling was carried out on contract, and supervised by the Engineers department.

As last year one of our major problem was the treatment of the Ludlowi areas. Where bunding was impossible recourse had to had to oiling and results may be said to have been on the whole very satisfactory indeed. But it has proved very trying as the bunds require constant watching and repairing while oiling is very difficult to supervise to be certain it is being well and faithfully done. Other carriers gave little trouble but the old maculatus areas still require unremitting attention as fresh seepages frequently occur. One of our greatest sources of danger is now that we have dried out these swampy ravines, we have made of them beautiful sites for houses and the result is that many of the old areas are rapidly being built over. Though we ask the architects to consult us in order that we may advise them what they may and may not safely do, they do not always ask us or, having received our advice, do not always follow it. It is particularly trying to go round an area after say six months and find hedges and trees planted in the path of the subsoil pipes and causing the old dangerous conditions to reappear. It is extremely difficult to get people, especially newcomers, to appreciate that we are not busy bodies interfering with their gardens, but that we are sincerely actuated by a desire to see that they do not contract malaria. While on this subject I would like to mention one of the commonest sources of danger and that is the cutting into the side of a ravine to form a new tennis court. If the hill is at all wet a maculatus breeding ground will be created in the angle of the cut for a certainty. We have had to subsoil pipe more than one of these. In one case recently several people went down with malaria before the fault was discovered. It is the easiest thing in the world to avoid this and we are only too pleased to advise and even assist if we are consulted. As a matter of fact all that we require can be made an integral part of the ordinary drainage of the tennis court.

Regular mosquito surveys were carried out and special surveys where necessary, all larvae being identified in the laboratory. Towards the end of the year a mosquito trap was brought into use. It was used on several occasions in the Katong district. The mosquito catch was identified and all fed anophelines were dissected. It has proved very useful and will be largely employed in future.

As already mentioned oiling was regularly carried out as an added precaution in certain districts, over 12,000 gallons being used.

The usual programme for the control of Stegomyia and other domestic mosquitoes was carried out by the Sanitary inspectors. It is uphill work but there are signs of regeneration and the more educated classes, at any rate, are beginning to realise that they themselves can do much to help.

As the campaign against mosquitoes extends an anomalous position arises, namely that the fewer mosquitoes there are the more complaints we get. It is welcome nevertheless as it indicates an awakening interest on the part of the Public. It is true that the source of complaint is often traced to stegomyia breeding which is in turn almost invariably due to carelessness or ignorance on the part of the householder. But, as I have already, said there are signs of regeneration, if frequent polite requests for help and advice may be so interpreted.

In this connection I would like to say that we are particularly grateful if catches of adult mosquitoes can be sent to the laboratory. From our accumulating experience the identification of the particular mosquito is often a revelation of its peculiar breeding ground, and no unnecessary time is wasted looking for it.

Generally with regard to this branch of health work I am pleased to report that it is taking its rightful part as one of the most important duties of the Sanitary Inspector. All of them are now receiving special training in the laboratory in the habits, identification etc. of mosquitoes. This is supplemented with special training in field work the object being that one day the Sanitary inspector will take entire responsibility in his own area.

GUNONG PULAI.

During the year the average daily population was 1,186. In 243 cases of fever in which the malaria parasite was demonstrated, 111 were definitely reported by the medical officer as relapses leaving 132 fresh cases, most of whom either said they had never had fever or that it was over a year from their last attack. With the exception of 2, who contracted malaria within 10 days of coming to the Gunong, all the others are reckoned to have contracted fever on the spot. This gives a fever rate of 109.6 per 1,000 per annum. This, though a little higher than the 1927 figure, is nevertheless extremely satisfactory.

It is interesting to record that about the middle of the year a sharp little outbreak was found to be associated with maculatus breeding in several of the treated ravines. A shortage of granite had driven the engineers, without consulting us, to break up the boulders in two ravines that were not supposed to be touched. So, too, with the main streams their operations in removing sand had created pockets in the banks where maculatus freely bred, while another short ravine, previously free from breeding, was found to be harbouring maculatus, after the complete cleaning of the Reservoir floor was carried out.

The health in other directions was remarkably good. The freedom from intestinal disease especially is most unusual, and can only be put down to the water carriage sewage system and perfect conservancy methods.

PONTIAN.

The big ditches, mentioned in my report of last year, as having been cut with a view to drying out the main swamp in front of the village have proved an unqualified success. As time goes on they scour themselves deeper and deeper—the drying effect being manifest in the swamp hundreds of yards away.

During the year the main streams were deepened by several feet and the water confined to a narrower deeper channel. The result has been the permanent drying out of numerous wet patches in the ravine floors and even the banks.

The maintenance of these streams and ditches should not be costly. Nothing more need be done except to patrol them carefully and to see that all obstructions etc. are immediately removed.

Most of the smaller ditches cut during 1927 to trap seepages were subsoil piped during the year, and at the moment of writing the permanent work is practically complete.

The floor of the reservoir upstream of the sub dam will, I am afraid, require careful watching. With the piling of the dam there are already indications that the passage of underground water is being impeded, and, with the added weight of the spoil it is just possible that this water may in time appear permanently on the surface. Should this happen however, I am confident it can be dealt with by frequent open ditches, graded toward the main stream. Any breeding in these will be possible of control.

The average daily population was 960 throughout the year. 222 cases of fever showed the presence of malarial parasites. 130 were definitely labelled relapses leaving 92 fresh cases. Of these 92 cases, 14 developed fever within 10 days of coming to Pontian, leaving 78, who, whatever their previous history, were taken to have contracted their malaria in Pontian. This gives a fever rate of 81.2 per 1,000 per annum as compared with 183 per 1,000 in 1927.

In connection with both fresh cases and relapses taken together I should mention that 21 out of the 222 or almost 10% developed malaria within 10 days, which incidentally throws rather a gruesome light on the fever state of the casual labour applying for work at Pontian, and even leads one to think that many even of the 78 may have been relapses of fever contracted elsewhere.

IX. SUPERVISION OF MIDWIVES AND INFANT WELFARE.

The nurses paid 12,866 visits including 10,140 first visits, 1,305 revisits and 1421 wrong addresses.

First Visit.—Infants seen numbered 9,625 or 61.9% of the total births are compared with 67.1 in 1927. Of these 168 were ailing and in 330 cases the cord was unhealthy.

There were 50 cases of twins and one of triplets. Infants not seen numbered 550, of whom 217 had been put out to nurse, 221 were still born 4 had been removed and 108 had died before a visit could be paid.

7,665 infants were being breast fed, 1 was receiving cow's milk, 1,683 tinned milk, 274 were partly on breast and partly on tinned milk, while 2 were receiving other suitable foods

Of the 1,962 bottles in use 518 were of unsuitable pattern while 69 were dirty.

The condition of the mothers when first visited was satisfactory in 9,891 cases and unsatisfactory in 190, while 22 had removed and 18 had died.

Of the mothers, 71 were attended at birth by medicalmen, 11 by A. Class midwives, 7,216 by B. Class, 1,346 by C. Class, 1,164 by friends and 313 were unattended.

Of the 10,121 mothers seen, 7,807 were living in cubicles or single rooms and 2,314 in houses of more than one room.

Revisits.—1,193 mothers and 1,155 infants were seen on revisits. Of the former 70 were in an unsatifactory condition while 24 had removed and 7 had died. Of the latter 98 were ailing, 20 had been removed and 21 had died.

CLINICS.

During the year 11,748 new babies were entered in the Clinic Books.

In the Clinics 23,238 consultations were held by the sisters in charge.

In the districts first visits were paid by the Health Visitors to 9,932 infants in their homes; 54,621 subsequent visits were paid to these infants.

There were 7,551 removals and wrong addresses, while 890 of the Clinic babies were reported as having died.

Summarised the work of the two Clinics amounted to 96,232 consultations on 11,748 babies.

MIDWIVES.

At the end of the year there were 419 midwives on the Register. During the year the registered midwives attended 9,700 cases.

The following return shows the number and nationality of cases attended by B. and C. class midwives.

Europeans	3
Eurasians	107
Chinese	8,134
Malays	1,105
Indians	262
Others	45
Total ..	9,656

A. Class midwives attended ..	44
B. & C. ,, ,, ..	9,656
In Hospitals there were ..	2,663
Total ..	12,363

The number of births registered during the year was 15,540 so that 79.5 per cent of the mothers received some kind of skilled attention at the birth of their children.

In 879 cases the whole of the midwife's fee and in 1,243 part of it, was paid by the Commisssioners—the total amount paid being $8,024.

With regard to this privilege which it has been the custom of the Municipal Commissioners to accord in the past, i.e. the payment of the midwifes' fee in necessitous cases, it has long been my conviction that it was largely being abused. This abuse was almost impossible to check and I accordingly therefore put forward a proposal that we should employ full time municipal midwives whose services would be available for those really in need of them. Accordingly at the beginning of the present year four were appointed. They are stationed at the Clinics, two at each. Any woman requiring their services may call there and book them.

X. FOOD AND MARKETS.

The report of the Market Insepctor is appended.

During the year stallholders were made to dismantle their stalls completely once a month. The result was that cleanliness was much easier maintained and there was a much needed improvement all round.

I would specially draw your attention to the Market Inspector's remarks regarding Maxwell Road Market which was opened late in the year. Here the anomalous position has been created that the Market itself has attracted to its vicinity hordes of unlicensed hawkers who, unhampered almost, ply their nefarious calling almost at its very doors with the result that the stallholders unable to make any profit are giving up their stalls and this magnificent market bids fair to be a white elephant. The question occupies the attention of the Municipal Commissioners at the moment but I am confident that nothing short of the power to confiscate and destroy the goods and stalls of these unlicensed hawkers will be of any permanent value.

I am afraid that not enough examination and inspection of foodstuffs exposed for sale in the shops throughout the town is being carried out. We have neither the staff nor is all of the available staff expert enough. It is hoped that in time as the Sanitary inspectors become more fully trained they will take over part of this work, but at the moment we require more expert staff as there is a large and increasing quantity, especially of poor quality tinned goods, finding its way from other countries into Singapore, where it seems to find a ready market.

XI. FOOD SHOPS, ETC.

Licences were issued for:—

446 Coffee Shops.
265 Eating Houses.
74 Meat Shops.
1 Fish Shop.
19 Bakeries.
4 Biscuit Factories.
5 Cake Shops.
11 Aerated Water Factories.
194 Milk Vendors.
80 Lodging Houses.

During the year these premises were the subject of numerous special visits by the Inspectors, with beneficial results. Here as in the markets following the general policy of the department, more reliance was placed on personal persuasion plus the power and the threat to cancel the licence, than the power to prosecute and obtain convictions in the Police Courts.

The policy too is being pursued of gradually clearing out all unsuitable premises and on the whole the general appearance and conditions, especially of the Coffee Shops and eating houses on which most of our attentions are concentrated, may be said to be extremely satisfactory indeed.

With regard to lodging house licences the number of these was gradually cut down, and it is my intention this year to issue no more.

The law with regard to the licencing of the various types of lodging and boarding houses is in a state of chaos and though Government were asked to consolidate it they could not see their way to do so. At the present moment almost every house in the town areas proper is let in lodgings, and, as such, should come under the law, which is of course ridiculous. So that I have given instructions that no further licences should be issued from my department. As a matter of fact our part should be limited to inspection and report on the suitability or otherwise of the premises and the actual licence should be issued by some other department. That is what we do at present in the case of native passenger lodging houses, the licencing of which is in the hands of the Protector of Chinese and in the case of Pilgrim lodging houses, licences for which are issued by the Chief Police Officer. The same principle should be applied to the licencing of all similar premises and all that we then would ask would be that our recommendations should be followed before licences are issued.

XII. PLACES OF PUBLIC RESORT.

Theatres, Hotels, Public Houses, Liquor Shops, Cinematograph Halls and Schools were inspected periodically and as often as asked for by the licencing authorities concerned.

With regard to schools the regulations are imperfect and leave much to be desired. The question might well be taken up by the authorities concerned. Many private schools are at present housed in buildings which are quite unsuitable and have been the subject of much recrimination between the owners or occupiers and the Education authority and this department.

XIII. SLAUGHTER HOUSES.

248,169 animals were received for slaughter as compared with 247,520 in 1927.

The figures were as follows:—

	1927	1928
Pigs	179,900	188,785
Sheep	32,643	32,069
Goats	10,939	8,250
Bullocks	23,107	18,208
Buffaloes	931	857
Total ..	247.520	248,169

24 animals were rejected as being unfit for slaughter while the carcases of 1,780 animals (pigs 1,599) dead or diseased were destroyed. 3,302 parts of diseased or injured animals were also destroyed.

24,406 Australian sheep were received for slaughter.

At the temporary abattoir in Bukit Timah Road 492 Australian cattle were slaughtered.

Toward the end of the year the construction of the new Pig Abattoir in Jalan Besar was put in hand. Just after it was commenced in was decided that funds would after all permit of the construction of a chilling room and consequently that has been incorporated in the design. It will be of great benefit as it will now be possible to do away with night slaughtering altogether. Except on a special order, it is intended that no carcase will leave the Abattoir until it has been for several hours in the chilling room. There will unquestionably be much opposition to this procedure but we must be adamant on the point as the present methods are intolerable.

In the new Abattoir, too, it will be possible to exercise much more expert supervision and it will be possible once for all to put a stop to the many abuses of the present system of slaughtering which from lack of space and expert supervision are almost incapable of detection.

The position with regard to the new permanent general Abattoir remains in statu quo. and depends entirely on what is to happen with regard to the deviation of the railway. Should it be diverted the suggestion is to build the new Abattoir and quarantine station somewhere in the valley of the Singapore River and near Buona Vista Road. If this site is finally selected then the question of facilities for importation on the hoof of Australian cattle should be settled for good.

Even if the above scheme does go through it must mean waiting at least another five years and one does not like to think of the present Abattoirs being in use for that further period. They outlived their usefulness many years ago and the less said about them the better. At the same time the new Pig Abattoir will relieve the congestion and when it is in use it is hoped to be able so to reconstruct Jalan Besar Abattoir that it will be possible to close down Pulau Saigon altogether. Though only a makeshift it will be all to the good as it will allow of better supervision.

With the appointment of a Municipal Veterinary Surgeon I now recommend that the care and control of the Abattoirs should be handed over to him entirely leaving the Health Officer to act as a referee only.

XIV. OFFENSIVE TRADES.

450 licences for offensive trades were issued the fees amounting to $3,466.91. This is a large reduction as previous years the chief cause of this being that no piggery licences were issued during the year. The reason for this is that it has been recognised that pigbreeding, as at present practised in the many ravines of the outskirts of the town, is incompatible with our present extensive programme of clearing these ravines and draining them and retaining them in a sanitary condition and free from mosquito breeding. Consequently these squatters, unless they comply with our bye laws, and I am afraid few if any can or will, must go elsewhere. Almost all of them have had over a years notice to quit, but no one will be evicted until the Anti mosquito gangs are ready to step in and clean up.

During the year special attention was directed to the Dairies and toward the end of the year, following a discussion on the purity of the fresh milk supply, a special experiment was undertaken with regard to a Buffalo dairy while a special cowshed was also in course of construction. During this year these will be under the constant supervision, and, may I say protection, of the department. If the experiment is a success, as there is no reason why it should not be, then all other dairies existing and to be built will be expected to conform to the Standards laid down for these two.

A special campaign was also undertaken against the Pineapple factories and our efforts in that direction have been reasonably successful when one takes into account the rather poor type of property in which that trade is carried on.

XV. BURIAL GROUNDS.

The number of burials in municipal grounds was as follows:—

	1928.	Since opening.
Bidadari Christian—		
Protestant division ..	147	2,540
French Roman Catholic division	201	2,950
Portuguese Roman ,, ,,	64	1,085
Pauper division ..	625	9,544
Bidadari Mohammedan—		
Mohammedan ..	1,151	5,012
Pauper ..	125	479
Bukit Brown (Chinese)—		
Chinese ..	686	3,281
Pauper ..	668	2,467
Hindoo Cemetery—		
Hindoo ..	328	989
Pauper ..	8	8
Cremations ..	108	352
Infectious Diseases—		
Serangoon Road ..	43	608
Yeo Chu Kang Road ..	1	555
Total ..	4,155	29,870

The Burial ground inspector made 2,081 inspections during the year while he attended 30 exhumations.

There were 116 cremations.

The total number of burials inside municipal limits for the year was 7,609 made up as follows:—

Europeans	72
Eurasians	116
Chinese	5,322
Malays	1,388
Indians	679
Others	32
Total ..	7,609

In addition to the municipal cemeteries there are in use 22 Public and 94 private cemeteries belonging to various nationalities.

XVI. STAFF.

Dr. W. E. Hutchinson was appointed Assistant Health Officer in succession to Dr. Copeland who resigned.

Dr. Lyall was appointed part time Lady Medical Officer in charge of Infant Welfare Work.

Miss Watson of the Infant Welfare branch resigned owing to ill health.

HEALTH OF MUNICIPAL STAFF.

There were 10,243 cases of sickness treated, 891 persons were sent to hospital, 9,808 days sick leave were granted and 7,438 dressings applied. 301 visits were paid to patients at their homes.

XVII. GENERAL.

There were 4,861 notices, including 489 intimations served during the year which with 993 from the previous year made a total of 5,854. Of these 4,584 were complied with.

There were 54 arrest cases mostly for selling milk without a licence.

There were 45,676 visits of inspection paid by the Sanitary inspectors, 1,733 prosecutions with 1,330 convictions with fines imposed amounting to $11,425, while 403 prosecutions were withdrawn.

The new Sanitary Inspectors' scheme has now been in force for some time. The results are extremely encouraging. Since it came into force eight probationers have joined the department and five of the senior men have obtained the Royal Sanitary Institute diploma.

In addition to being seconded to the local school to study for the diploma a series of lectures is given to all the inspectors in the office. Attendance at these is compulsory. Two sessions of lectures, extending over a period of four months are given annually while an examination is held in December.

The syllabus of lectures, which are given by the officers of the Health department, embraces a wide range including such subjects as Elementary Physics and Chemistry, Law, Inspection of Dwellings and factories, Ventilation, Water, Building sites and materials, Anti malarial work and mosquitoes, meat and other foods, Refuse disposal, treatment of Sewage, etc., etc.

So far as possible lectures are illustrated by means of lantern slides and to assist further in the training a museum has been formed and is daily being added to. It contains many working models and diagrams and generally has proved a very useful and interesting adjunct to the lectures.

The following reports and returns are appended.

Anti Mosquito Report.
Report of the Analyst.
" " Bacteriologist.
" " Superintendent Middleton Hospital.
" " Food and Market Inspector.

Return of Inspector's Prosecution, etc.
Return of Notices.
Summary of Arrest Cases.
Return of Licences for Offensive Trades.

In conclusion I wish to record my appreciation of the whole-hearted way in which all members of the staff have co-operated during the year, to further the work of the department.

I have also to record my thanks to Mr. Stone of the Audit department for his assistance in preparing the Charts and for his advice and help generally.

I have the honour to be,
Sir,
Your obedient servant,
P. S. HUNTER,
M.A., M.B., Ch.B., D.P.H.,
Municipal Health Officer.

Municipal Health Office,
Singapore, 19th February, 1929.

To

The Municipal Health Officer.

Sir,

I have the honour to forward the following report on anti-mosquito measures carried out in the Municipal Area during the year 1928.

ANTI-MALARIAL WORKS.

New permanent works were carried out in the following areas:—

1 Adam Road Area.
2 Katong Area.
3 Swettenham Road Area.
4 Jervois Road—Alexandra Road Area.
5 Mandalay Road.
6 Telok Blangah Road (1).
7 Jalan Besar Area.
8 McPherson Road Area.
9 Balmoral Road.
10 Chinese High School-Bukit Timah Road.
11 Wayang Satu Area.
12 McNair Road.
13 Kim Seng Road Area.
14 Telok Blangah Road (2).
15 Western Reclamation.
16 Maxwell Road.
17 Berlayer Village.
18 Spottiswoode Park.
19 Ben Venue—Tanglin Road.
20 Sago Factory—Outram Road.
21 Chancery Lane.
22 Kampong Java Road.
23 Gilstead Road No. 9A.
24 Ewe Boon Road.

(1) ADAM ROAD AREA.

The work of clearing and draining the ravines in this area was continued during the year.

The main earth drains from Bukit Timah Canal to the heads of ravines A and B were replaced by a concrete antimalarial drain.

1,610 yards of drain were constructed.

Seepages in the ravines were dealt with by laying subsoil pipes. 4,901 eight-inch pipes and 704 five-inch pipes were laid.

Work is in progress.

(2) KATONG AREA.

The fish pond behind Grove Estate, in the vicinity of which were many breeding places of A. ludlowi, was drained by constructing a tidal gate in the bund between the pond and Geylang River.

(3) SWETTENHAM ROAD AREA.

Work in this area was completed. A twenty-one inch revetted concrete channel was laid for a distance of 2,392 feet and 1,688 eight-inch subsoil pipes were laid to deal with seepages.

(4) JERVOIS—ALEXANDRA ROAD AREA.

This area comprises the low lying land between Jervois Road and Alexandra Road. A main earth drain was constructed running parallel to the Gunong Pulai pipe line and discharging into the Singapore River near Delta Road Bridge.

1,962 feet of main earth drain were cut and 561 feet of subsidiary earth drains. Eight large ponds and six wells were drained and filled in.

234 eight-inch subsoil pipes, 147 five-inch pipes and 180 four-inch pipes were laid.

The main earth drain at the head of the ravine in this area was later replaced by an open concrete channel. 215 fifteen-inch inverts, 100 nine-inch inverts and 224 twenty-four inch by eighteen-inch revetment slabs were laid.

(5) MANDALAY ROAD.

The larvae of A. maculatus were found in seepages in the compound of No. 6 Mandalay Road. These seepages were drained by laying 73 eight-inch and 93 five-inch subsoil pipes.

(6) TELOK BLANGAH ROAD (1).

The larvae of A. maculatus were found in seepages at the foot of the slope in the property adjoining the mosque.

A retaining wall of block granite and cement 60 feet by 4 feet was constructed and a line of subsoil pipes laid behind the wall to trap the seepages.

180 eight-inch pipes and 150 five-inch pipes were laid.

(7) JALAN BESAR AREA.

Numerous breeding places of A. sinensis and A. ludlowi were found in the swampy land between Serangoon Road and Jalan Besar. The area was drained by cutting a main earth drain from Paya Road through the "New World" to Lavender Street and some subsidiary drains.

3,560 feet of earth drain were cut and several ponds filled in.

(8) McPHERSON ROAD AREA.

This area embraces the ravine running north from McPherson Road along the eastern boundary of the Alkaff Gardens and continuing on through the Mohamedan Cemetery at Bidadari. The floor of the ravine was cleared of all under growth and trees. 590 trees were removed.

13,157 feet of main earth drains were cut, 28 ponds were drained and filled in, and an area of approximately 20 acres was levelled off.

(9) BALMORAL ROAD.

This area embraces the low land between Goodwood Hill and Bukit Timah Road. A number of potentially dangerous seepages were discovered at the foot of Goodwood Hill. 64 rubber trees were removed and a deep trench was cut for a distance of 800 feet from Bukit Timah Road to the foot of Goodwood Hill. A line of 576 eight-inch subsoil pipes was laid to drain the seepages and two large ponds were drained.

193 fifteen-inch concrete inverts were also laid.

(10) CHINESE HIGH SCHOOL-BUKIT TIMAH ROAD.

The larvae of A. maculatus and A. karwari were found in the grounds on the right of the main entrance in seepages and in wells.

384 eight-inch subsoil pipes were laid to drain the seepages and eight wells were closed.

(11) WAYANG SATU AREA.

The drainage of this area was extended. The ravine running up to Kheam Hock Road just below Bukit Brown Cemetery was cleared of trees and undergrowth. A central earth drain was cut for a distance of 5,352 feet and subsidiary drains for a distance of 660 feet.

303 ponds were drained.

(12) McNAIR ROAD.

A swampy area to the south of McNair Road near the Government School was cleared and drained.

2,840 feet of earth drain were cut and 33 ponds and 14 wells were filled.

(13) KIM SENG ROAD.

A tidal gate consisting of 2 twenty-one inch pipes with iron flaps was constructed at the outlet of the main drain from the Leonie Hill Area.

(14) TELOK BLANGAH ROAD (2).

A swampy area near the entrance to St. James Power Station was drained and a concrete invert channel laid to discharge into a culvert under the railway.

105 nine-inch concrete inverts were laid.

(15) WESTERN RECLAMATION.

To complete the drainage of this area a further 3,800 feet of earth drains were cut. These drains were later replaced by subsoil pipe drains and open invert channels.

565 four-inch subsoil pipes, 3,117 five-inch pipes, 227 nine-inch concrete inverts, 305 twelve-inch inverts and 35 concrete revetment slabs were laid.

(16) MAXWELL ROAD.

458 five-inch subsoil pipes were laid to drain seepages appearing at the foot of the hill opposite St. Andrews Hospital and on the slope of the hill in Maxwell Road.

(17) BERLAYER VILLAGE.

There are two ravines in this area which were found to be breeding places of A. umbrosus and A. maculatus.

Ravine (1) was cleared of undergrowth and trees and a main earth ditch cut for a distance of 703 feet from the head of the ravine to its junction with the tidal swamp. Seepages in the head of the ravine and on the slopes were drained by subsoil pipes.

403 eight-inch pipes and 395 six-inch pipes were laid, discharging into a concrete spillway.

Ravine (2) was cleared of undergrowth and trees and a main earth drain cut for a distance of 525 feet. Subsidiary drains were cut for a distance of 375 feet.

The floor of the ravine was levelled off and two wells were closed.

(18) SPOTTISWOODE PARK.

A dangerous seepage at the foot of the bank below the entrance drive was drained by laying 360 four-inch subsoil pipes.

(19) BEN VENUE—TANGLIN ROAD.

Larvae of A. karwari were found in seepages on the slope behind the old filled pond. These seepages were dissipated by laying a deep contour line of subsoil pipes discharging into the roadside drain in Tanglin Road.

230 eight-inch subsoil pipes were laid.

(20) SAGO FACTORY POND—OUTRAM ROAD.

The deep pond on this property was found to be a prolific breeding ground of A. ludlowi.

The pond was cleared of vegetation and a drain cut from it to the creek 260 feet distant.

The pond was left tidal.

(21) CHANCERY LANE.

The larvae of A. karwari were found on several occasions in seepages on the land in front of No. 33 Chancery Lane. This land was drained by laying 346 five-inch subsoil pipes discharging into the roadside drain in Chancery Lane.

(22) KAMPONG JAVA ROAD.

Seepages in the land behind the Animal Infirmary was drained by laying two lines of eight-inch subsoil pipes discharging to Kampong Java Road.

(23) GILSTEAD ROAD No. 9A.

The larvae of A. karwari were found in a seepage in this compound which was drained by laying 143 six-inch subsoil pipes discharging into the concrete sullage drain which was lowered for a distance of 108 feet in order to take the subsoil pipe outlet at a convenient level.

(24) EWE BOON ROAD AREA.

Larvae of A. maculatus were found in a seepage on the bank at the rear of No. 21 Ewe Boon Road. This seepage was drained by laying 60 four-inch subsoil pipes discharging into the concrete sullage drain. The main earth drain in this area was diverted and extended for a distance of 300 feet to discharge into Bukit Timah Road drain beside house No. 329.

MAINTENANCE OF EXISTING WORKS.

Extensions and repairs to existing works were carried out at:—

HOLLAND PARK No. 1.

Some rubble drains in this area were replaced by subsoil pipes.

459 four-inch pipes were laid.

JERVOIS ROAD.

A large spring below Sri Menanti Road was drained by laying 45 five-inch subsoil pipes discharging into a culvert under Jervois Road. In area No. 1 the drains round the tennis court of No. 5 Bishops gate were replaced by underground drains.

205 five-inch subsoil pipes were laid.

MELROSE AREA.

The larvae of A. maculatus were found in the existing earth drain. The subsoil pipes above the spillway were taken up, the main drain was deepened throughout and subsoil pipes were laid at a lower level. Above the pipes at a depth of 3 feet a concrete invert channel was laid to take the sullage drainage from "Melrose."

705 eight-inch subsoil pipes were laid in a double row and 225 six-inch concrete inverts were laid.

WOODLEIGH FILTER BEDS.

The earth ditches in Ravine No. 3 were found to contain the larvae of A. maculatus. These ditches were regraded, drained by subsoil pipes and filled in.

530 eight-inch pipes and 150 four-inch subsoil pipes were laid. A seepage behind the clear water tank was drained by laying 50 four-inch subsoil pipes.

GALLOP ROAD AREA.

Seepages round the tennis court of "Mallaig" Gallop Road were drained by laying 277 five-inch subsoil pipes.

IRWELL BANK AREA.

Seepages appearing along the foot of the slope necessitated the laying of 300 five-inch subsoil pipes.

NASSIM ROAD.

Seepages in the compounds of Nos. 7 and 16 Nassim Road in which the larvae of A. maculatus had been found were drained by laying 250 five-inch pipes, 60 four-inch pipes and 30 six-inch pipes.

THOMSON ROAD—JEWISH CEMETERY.

A concrete invert channel was laid in this area along the foot of the hill near Moulmein Road for a distance of 259 yards.

WISHART RAVINE.

Fresh seepages which appeared on the slopes of this ravine, necessitated the laying of 250 five-inch subsoil pipes. Larvae of A. maculatus were found on several occasions in the main open earth channel. This channel was replaced by subsoil pipes from the head of the subsidiary ravine on the left to the point where sullage drainage from squatters huts enters the stream. A double row of eight-inch subsoil pipes was laid from the sump at the head of the subsidiary ravine to the spillway in the main ravine and below that a treble line of eight-inch subsoil pipes was laid to a new concrete spillway constructed opposite the first huts. 1,783 eight-inch pipes, 556 five-inch pipes and 392 four-inch pipes were laid. The stream bed immediately below the spillway was converted into a stone channel for a distance of 200 feet.

CLAYMORE AREA.

The earth ditch running from Bukit Timah Road to the house sullage drains of Nos. 34 and 35 Stevens Road was deepened and regraded for a distance of 1,157 feet and 417 twelve-inch concrete inverts were laid.

The concrete revetted channel from the Bukit Timah exit was taken up and relaid at a level of 30 inches lower. An extension of 192 feet of this channel was constructed of 96 twele-inch concrete inverts.

GOVERNMENT HOUSE GROUNDS.

The larvae of A. maculatus were found on the edges of the large concrete drain which discharges from the ravine adjoining the gate in Cavenagh Road. The seepages were drained by subsoil pipes. A swampy patch close to the tennis court was also drained and an existing subsoil pipe line was taken up and relaid.

392 four-inch pipes and 35 eight-inch pipes were laid.

CHANDU FACTORY RAVINE.

A section of open concrete channel in this ravine was taken up and replaced by subsoil pipes.

360 eight-inch and 27 five-inch pipes were laid.

NEWTON ROAD AREA.

An earth drain was cut for a distance of 278 feet as an extension of the channel on the left of Gentle Road. It connects with the drainage of Buckley Road. An old drain running diagonally across the property for a distance of 190 feet was filled in.

PEARLS HILL.

The disused Sikh bathing place was drained by subsoil pipes. 45 five-inch pipes were laid.

IRWELL BANK ROAD.

A dangerous seepage which appeared on the bank below Irwell Bank Road was drained by laying 255 five-inch pipes and 85 four-inch pipes.

KAMPONG JAVA AREA.

As part of the improvement scheme for this area the main earth drains have been replaced by open concrete drains. 2,884 feet of old earth drains were filled in.

PATERSON ROAD AREA.

The main earth drain. in this area was replaced by an open concrete channel running along the roadside. Subsoil water was drained off by laying 810 eight-inch subsoil pipes in the old stream bed. The pipes discharge into the new channel opposite Orchard Road Police Station. The old earth drains were filled in.

BUKIT BROWN AREA.

Seepages at the junction of ravines C and C1 were drained by laying 465 eight-inch subsoil pipes.

ORCHARD ROAD AREA No. 3.

An extension of 245 five-inch subsoil pipes was laid in this ravine.

HOLLAND ROADSIDE AREA.

A seepage in the earth drain on the left of Tyersall Road was piped to the culvert crossing Holland Road. A short length of nine-inch concrete channels was laid over the pipes to protect them from scour.

67 four-inch subsoil pipes and 27 nine-inch concrete inverts were laid.

GLENCAIRD AREA.

Seepages at the foot of the hill below Cree Hall were drained by laying 462 eight-inch subsoil pipes and 261 twelve-inch concrete inverts.

BARKER ROAD AREA.

Seepages at the foot of the hill behind 26 Barker Road, where the larvae of A. karwari were found, were drained by laying 334 eight-inch pipes discharging into the roadside drain in Barker Road.

HENDERSON ROAD AREA.

A new line of earth drain was cut as an extension to this area leading from behind the new sewage filters to the main anti-malarial channel. 1,997 feet of earth drain were cut and 120 four-inch subsoil pipes were laid.

GEYLANG AREA.

The main tidal bund from Lorong 14 to Lorong 38 was raised two feet over its entire length a distance of 5,608 feet. Tide gates Nos. 5 and 8 were taken up and the gaps permanently filled in.

KATONG AREA.

The tidal bund round the old fish pond at the back of Grove Estate was raised in level another foot over a distance of 2,455 feet. A deep drain was cut along the inside of the bund. Two breaches in the bund were repaired.

MINOR REPAIRS AND EXTENSIONS TO EXISTING DRAINS.

Small extensions were made to deal with dangerous mosquito breeding grounds in other anti-malarial areas where the following materials were used:—

11	twenty-one	inch	concrete	inverts.
177	eighteen	,,	,,	,,
34	fifteen	,,	,,	,,
144	twelve	,,	,,	,,
88	nine	,,	,,	,,
10	six	,,	,,	,,
173	Concrete revetment slabs 24 in. x 18 in.			
5	fifteen-inch	subsoil	pipes.	
474	eight-inch	,,	,,	
77	six-inch	,,	,,	
478	five-inch	,,	,,	
230	four-inch	,,	,,	

MAINTENANCE.

Routine maintenance was carried out in all the existing areas. The following list shows the principal anti-malarial areas and the lengths of open earth channel drain, open concrete drain and subsoil pipe drain constructed in each.

Area No.	Name of Area.	Earth Drains yards	Concrete Channel yards	Subsoil pipes yards
1	Anderson Road ..	...	...	2,426
2	Barker Road ..	...	50	676
3	Bukit Timah Road ..	...	3,168	...
4	Claymore ..	...	678	533
5	Cluny Ravine ..	...	797	951
6	Cuppage Road ..	...	53	547
7	Glencaird	...	1,032	1,862
8	Kings Road—Tyersal ..	...	1,058	3,322
9	Nassim and Dalvey ..	...	1,019	3,363
10	Fernhill ..	...	988	1,241
11	Paterson Road ..	...	...	270
12	Scotts Road ..	250	...	...
13	Stevens Road ..	...	544	397
14	Watten Estate ..	...	683	3,101
15	Woodleigh Filters ..	...	308	1,987
16	Tyersal Ponds ..	...	240	1,677
17	Chandu Factory Ravine	...	132	965
18	Hammer & Co's Reservoir ..	...	25	653
19	Singapore Harbour Board Reservoir	...	398	1,508
20	Jervois Road No. 1 ..	...	986	2,169
21	„ „ No. 2 ..	...	215	534
22	„ „ No. 3 ..	1,804	227	154
23	Keith Swamp ..	...	...	1,063
24	Leonie Hill ..	...	459	652
25	Morse Road ..	...	69	1,586
26	Mosque Ravine ..	...	...	1,170
27	One Tree Hill ..	...	1,141	1,773
28	Orchard Road No. 1 ..	...	528	465
28	„ „ No. 2 ..	...	82	895
30	„ „ No. 3 ..	...	248	275
32	Radin Mas ..	600	368	6,957
33	River Valley Road ..	...	352	...
34	Shanghai Road ..	...	51	401
35	Teong Bahru ..	...	993	547
36	Wishart Ravine ..	...	20	1,947
37	Woodneuk ..	264	...	67
38	Alexandra Swamp ..	3,508	...	...
39	Ballestier Plain ..	200	963	...
40	Cluny Ravine ..	...	556	417
41	Gallop Road ..	350	...	1,419
42	Grange Road ..	...	1,175	...
43	Holland Park No. 1 ..	...	982	1,735
44	„ „ No. 2 ..	...	275	1,343
45	Holland Road ..	...	781	22
46	Melrose ..	...	209	1,061
47	Newton Ponds ..	...	750	...
	Carried forward ..			

Area No.	Name of Area.	Earth Drains yards	Concrete Channel yards	Subsoil pipes yards
	Brought forward ..			
48	Rochalie Drive ..	...	528	50
49	Swettenham Road Ravine ..	...	861	563
50	Tanglin Barracks No. 1 ..	...	1,307	2,602
51	„ „ No. 2 ..	...	2,140	4,547
52	„ „ No. 3 ..	...	1,850	3,880
53	Tanglin Hill No. 1 ..	...	223	1,764
54	„ „ No. 2 ..	...	619	1,546
55	Fort Canning ..	...	19	233
56	Henderson Road ..	350	264	40
57	Bukit Brown ..	830	...	7,308
58	Kampong Java ..	3,096	...	321
60	Keppel Golf Club ..	...	...	617
62	Kramat Road ..	...	...	52
63	Swiss Cottage ..	...	704	372
64	Thomson Road—Chancery Lane ..	...	252	174
66	Tanglin Road Ravine ..	...	...	77
67	Spottiswoode Park ..	...	566	120
68	Pearls Hill ..	...	...	402
69	Ballestier Road Ravine ..	...	...	378
70	Chancery Lane ..	...	480	...
72	Irwell Bank Road ..	...	...	478
73	Mandalay Road ..	...	170	55
80	Economic Gardens ..	...	704	...
81	Mount Rosie ..	...	3,080	3,749
83	Swiss Cottage ..	...	...	205
84	Chancery Lane ..	...	125	319
85	Ewe Boon Road Area ..	200	...	20
86	Sarkies Road ..	...	...	220
87	Thomson—Ballestier Roads ..	260	...	...
88	Thomson Road—Jewish Cemetery ..	680	...	...
89	Kampong Bahru ..	...	1,100	66
90	Outram Road Ice Factory ..	...	69	77
91	Holland—Bukit Timah Road ..	...	1,804	...
92	Holland Park No. 3 ..	563	...	...
94	Bushey Park ..	800	...	76
95	Nassim Road ..	...	...	94
96	Western Reclamation ..	...	1,255	1,717
97	Wee Avenue ..	...	200	192
98	Chinese High School ..	...	...	115
100	Adam Park ..	1,906	2,053	1,868
101	McPherson Road Area ..	2,199	...	...
104	Geylang Bunded Area ..	...	...	...
105	Katong Bunded Area ..	...	...	...
106	Jalan Besar ..	1,320	...	...
107	Wayang Satu ..	2,646	...	...
108	Berlayer Village Ravines ..	146	...	...
	Total ..	21,972	42,976	86,428

A key map showing the position of these areas can be inspected in the Health Office.

MOSQUITO SURVEYS.

Systematic surveys were carried out throughout the year and 800 collections of mosquito larvae were examined and indentified in the laboratory.

GENERAL ANTIMOSQUITO WORK.

Two patrol gangs cleared and regraded 167,571 yards of earth drains and collected and disposed of 6,032 large baskets of empty tins, bottles etc., and filled 30 ponds and 92 wells.

OILING.

12,394 gallons of anti-malarial mixture were used in the Katong, Jalan Besar and General Hospital Areas.

CONTROL OF DOMESTIC MOSQUITO BREEDING.

During the year mosquito larvae were found by Sanitary Inspectors in the course of their rounds in 8,826 houses and compounds or 19.32 per cent of those visited.

534 notices were served during the year under the Destruction of Mosquitos Ordinance.

I have the honour to be,

Sir,

Your obedient servant,

W. DAWSON,

Deputy Health Officer.

Singapore Municipality

Twenty First Annual Report

of the

Municipal Analytical Laboratory

For the Year

1928

by

COLIN C. B. GILMOUR, M. A., M. B.

Analytical Laboratory,

Singapore, 18th March, 1929.

THE MUNICIPAL HEALTH OFFICER,
SINGAPORE.

SIR,

I have the honour to submit the 21st Annual Report of the Municipal Analytical Laboratory.

During the year 1928 the number of samples analysed was 15,607 made up as follows:—

Waters from the Municipal Public Supply	11,079
Waters from Johore	37
Waters from Kallang and Woodleigh Regulating Chambers	106
Well Waters	179
Miscellaneous Waters	26
Sewage and Effluents from the Municipal Sewage Works	3,151
Sewage and Effluents from Private Installations	190
Milks from Itinerant Vendors	107
Tinned Milks	24
Milk Foods	1
Emulsified Milks	32
Human Milk	1
Tea	1
Coffee	1
Aerated and Mineral Waters	37
Samples from C. R. E. J.	1
Samples from Municipal Engineer	51
Samples from Gas Engineer	21
Samples from Electrical Engineer	278
Samples from Water Engineer	282
Samples from Health Department	2

MUNICIPAL WATERS.

During the year 11,079 samples from the Municipal Public Supply were analysed, the samples being taken daily from all parts of the system, from the streams on the catchment area to various taps and standpipes in town, so that the whole of the water supply was under daily scrutiny.

Throughout the year all water passed into the town mains was filtered and chlorinated, except for a short time at the end of the year when chlorination at Woodleigh was stopped. No traces of free Chlorine could be detected in the water in the mains by Chemical tests and no taste due to Chlorine developed.

No traces of unoxidized sewage contamination were found in any of the tap samples.

The streams supplying Mc. Ritchie and Pierce Reservoirs, remained free from gross contamination during the year, and the samples taken at the valve towers were also above suspicion.

Traces of contamination were found in the water from the Gunong Pulai pipe Line on several occasions, during the first three months of the year, and once, in March, in a sample from Seletar Reservoir.

Some anxiety was caused in June by the appearance of Nitrites in the effluent from some of the Woodleigh Filter Beds. Nitrites continued present in the samples of effluent for several days, although none were present at the inlet, or in the water actually in the filter. At the same time the Bacteriological results were excellent, proving that there was no living contamination. At this time the water at Woodleigh was being treated with lime, to reduce the amount of carbon dioxide, and thus prevent the solution of iron in the water, and the Nitrites were doubtless formed by chemical action between the ammonia and iron, in the bed itself. On stopping the addition of lime the Nitrites disappeared. For a few days prior to this appearance of nitrites in the effluent, the amount of Carbon Dioxide had varied from 0.30 to 0.26 while previously it had varied from 0.5 to 1.06 parts per 100,000. When the addition of lime was stopped the amount rose to 0.4 near which figure it has since remained. It was of course hardly possible that contamination, sufficient to give such a distinct trace of Nitrites as was present, could occur without greatly affecting the bacteriological analyses, but, until there was no doubt that the phenomenon was not due to contamination by sewage, the amount of chlorine in the clear water tank was increased.

The yellow colour of the tap water as tested by the Lovibond Tintometer in a two foot tube varied from 1.3 to 2.5 except in June when it went up from 1.5 to 4.8.

The following are analyses of average samples of water taken from the Impounding Reservoirs and Tap.

	Results expressed in parts per 100,000		
	McRitchie Reservoir	Pierce Reservoir	Tap
Total Solids ..	2.8	2.4	2.2
Total Organic Solids ..	1.2	1.2	0.6
Total Inorganic Solids ..	1.6	1.2	1.6
Free and Saline Ammonia ..	Absent	Absent	Absent
Albuminoid Ammonia ..	0.002	0.0015	0.002
Chlorine as Chlorides ..	0.1	0.1	0.1
Nitrogen as Nitrites ..	Absent	Absent	Absent
Nitrogen as Nitrates ..	Absent	Absent	Absent
Oxygen absorbed in 3 minutes ..	0.020	0.037	0.015
Oxygen absorbed in 4 hours ..	0.064	0.086	0.041
Total Hardness ..	0.5°	0.5°	0.5°
Temporary Hardness ..	0.0°	0.0°	0.0°
Permanent Hardness ..	0.5°	0.5°	0.5°
Poisonous Metals ..	Absent	Absent	Absent
Iron ..	0.06	0.07	0.04
Appearance in 2 ft. tube ..	Slightly Cloudy	Slightly Cloudy	Slightly Cloudy
Colour in 2 ft. tube Lovibonds—			
Yellow ..	5.5	5.8	1.6
Red ..	0.8	1.0	0.35
Blue ..	0.6	0.7	0.80
P.H. Value ..	7.4	7.4	7.4
Reaction ..			

JOHORE WATERS.

37 Routine samples were analysed. They were all free from unoxidised sewage contamination except one sample in October taken from Pontian Kechil. Considerable variations in colour occurred during the year. The following are representative analyses.

	Results in parts per 100,000		
	Pulai II	Pulai III	Pontian Kechill
Free and Saline Ammonia ..	0.001	0.0015	Absent
Albuminoid Ammonia ..	0.002	0.002	0.003
Chlorine as Chlorides ..	0.1	0.1	0.1
Nitrogen as Nitrites ..	Absent	Absent	Absent
Nitrogen as Nitrates ..	Absent	Absent	Absent
P.H. Value ..	7.4	7.3	7.3
Iron ..	0.02	0.02	0.02
Appearance ..	Bright and clear	Bright and clear	Bright and clear
Colour in 2 ft. tube—			
Yellow ..	1.40	1.75	3.00
Red ..	0.30	0.55	0.90
Blue ..	0.70	0.70	0.70

TOTAL SOLIDS.

106 samples from the Regulating Chambers at Kallang and Woodleigh were analysed and the total solids, reaction and amount of iron determined. The results varied as follows.

	Total Solids	Total Organic Solids	Total inorganic Solids	PH	Iron
	From To	From To	From To	From To	From To
Kallang ..	2.26–2.92	0.88–1.32	1.23–1.86	8.0–8.5	0.03–0.36
Woodleigh ..	2.48–2.95	1.04–1.30	1.44–1.80	8.0–8.5	0.03–0.36

WELL WATERS.

179 samples were examined and all were condemned being contaminated with unoxidised sewage matter.

MISCELLANEOUS WATERS.

26 samples were analysed of which 16 were samples of chlorinated water from Mandai. Free chlorine was present in 13 of these and the remainder from which free chlorine was absent were contaminated with unoxidised sewage matter. 10 samples included 2 sent in for decision as to whether the water had leaked from the municipal mains or came from other sources. The remainder were for full analysis and were of good quality.

SEWAGES AND EFFLUENTS FROM THE MUNICIPAL SEWAGE WORKS.

3,151 Samples were received for analysis.

Most of the analyses were done at the branch laboratory at Alexandra Road Sewage Works.

The amount of suspended matter in the crude sewage varied from 33 to 69 parts per 100,000. Various analyses were made to determine variations in suspended matter during the day, samples being taken at 2 hourly intervals. These shewed considerable variation. The following is a typical result.

8 a.m.	10 a.m.	12 noon	2 p.m.	4 p.m.	6 p.m.
27.0	43.0	50.0	51.0	53.0	29.0

The Bioaeration Unit has not been very satisfactory. Good results have been obtained only for short periods, and then only when working at low rates. The effluent from the filter beds has been better than that from the Bioaeration unit as regard suspended matter and oxygen absorption. Some typical results are given below.

1st JUNE, 1928.

	Results in parts per 100,000	
	Crude Sewage	Imhoff Tank
Free and Saline Ammonia	4.82	4.23
Albuminoid Ammonia ..	1.41	1.24
Oxygen absorbed in 3 minutes	3.46	2.73
Oxygen absorbed in 4 hours	7.77	6.01
Nitrogen as Nitrites	—	—
Nitrogen as Nitrates	—	—
Reaction	Alkaline	Alkaline
Suspended Matter	45.0	37.0
Chlorine as Chlorides	60.0	51.0

	Results in parts per 100,000			
	Coral Beds	Granite Beds	Bioaeration	Fall
Free and Saline Ammonia ..	1.92	0.54	2.64	2.40
Albuminoid Ammonia ..	0.28	0.12	0.24	0.36
Oxygen absorbed in 3 minutes	0.52	0.25	0.57	1.10
Oxygen absorbed in 4 hours ..	1.14	0.79	1.22	2.85
Nitrogen as Nitrites ..	Excessive	Excessive	Trace	Trace
Nitrogen as Nitrates ..	0.7	1.3	0.3	0.2
Reaction ..	Alkaline	Alkaline	Alkaline	Alkaline
Suspended Matter ..	3.5	2.6	3.6	11.2
Chlorine as Chlorides ..	48.0	46.0	52.0	49.0

1st NOVEMBER, 1928.

	Results in parts per 100,000	
	Crude Sewage	Imhoff Tanks
Free and Saline Ammonia	3.03	4.21
Albuminoid Ammonia	1.02	0.81
Oxygen absorbed in 3 minutes	2.55	1.78
Oxygen absorbed in 4 hours	6.03	4.38
Nitrogen as Nitrites	—	—
Nitrogen as Nitrates	—	—
Reaction	Alkaline	Alkaline
Suspended Matter	36.0	27.0
Chlorine as Chlorides	182.0	141.0

	Results in parts per 100,000			
	Coral Beds	Granite Beds	Bioaeration	Fall
Free and Saline Ammonia ..	0.72	0.60	2.64	2.40
Albuminoid Ammonia ..	0.14	0.12	0.18	0.28
Oxygen absorbed in 3 minutes	0.24	0.26	0.50	0.92
Oxygen absorbed in 4 hours ..	0.71	0.77	1.09	2.26
Nitrogen as Nitrites ..	Excessive	Excessive	Excessive	Excessive
Nitrogen as Nitrates ..	1.0	1.5	0.2	0.2
Reaction ..	Alkaline	Alkaline	Alkaline	Alkaline
Suspended Matter ..	2.3	2.4	3.3	8.4
Chlorine as Chlorides ..	102.0	108.0	95.0	127.0

It will be seen that the final effluent at the Fall is still far below the standard laid down for suspended matter and oxygen absorption.

Towards the end of the year a series of determinations of the amount of Chlorides present in the sewage at People's Park Pumping Station was done.

The samples were taken every 2 hours from 7th November to 31st December. It was shown that a very great increase in the amount of chlorides took place regularly between 11 p.m. and 5 a.m. every day irrespective of the state of the tides. On occasions of high morning tides there was also an increase between 11 a.m. and evening. This variation in chlorides, due to leakage of sea water into the sewers, may be a very big factor in causing the difficulties we have in dealing with sewage. It will be necessary to find out whether the periodic changes in chlorides are met with in the sewage actually delivered at the works. The following are some typical results of these chloride analyses.

Date	7 A. M.	9 A. M.	11 A. M.	1 P. M.	3 P. M.	5 P. M.	7 P. M.	9 P. M.	11 P. M.	1 A. M.	3 A. M.	5 A. M.
16—17.12.28	68	60	51	81	89	73	72	98	108	128	143	94
23—24.12.28	52	48	50	56	49	49	50	76	95	98	122	104
30—31.12.28	146	114	136	396	345	242	235	248	268	270	276	322

SEWAGE AND EFFLUENTS FROM PRIVATE INSTALLATIONS.

190 samples were analysed. The results were on the whole satisfactory except in one or two plants where the amount of suspended organic matter in the tank effluent was very high and the filter bed seemed to have little effect on it. In one case it is possible that the bad results were partly due to the use of disinfectants. In one case the suspended matter in the sedimentation tank effluent was 16.2 parts per 100,000 and in the filtered effluent 15.6 of which 14.2 was organic matter.

MILKS FROM ITINERANT VENDORS.

107 samples were collected of which 55 were adulterated. Certificates were issued in 29 cases of which 28 were for adulteration with water and 1 for a deficiency in fat of 7.7 per cent. The following table shows the number of samples taken for the last 10 years, the percentage adulterated and the average adulteration.

Year	Number	percentage Adulterated	Average Adulteration.
1919 ..	396	26.8	—
1920 ..	807	18.3	13.8
1921 ..	728	18.1	9.2
1922 ..	819	15.4	13.6
1923 ..	534	18.7	14.3
1924 ..	444	17.8	19.2
1925 ..	319	24.6	15.1
1926 ..	398	18.8	12.6
1927 ..	290	20.0	14.5
1928 ..	107	51.4	14.2

TINNED MILKS.

24 samples of tinned milk were analysed. In one case the dilution clause was wrongly worded and in 4 cases the milk did not come up to standard when diluted in accordance with the directions given. The vendors were informed that the dilution must be altered.

RECONSTITUTED MILKS.

32 samples were analysed and all were up to standard.

MILK FOODS.

1 sample was analysed.

TEA.

One sample was analysed and conformed to our regulations as regards ash and extractives but the labelling was incorrect.

AERATED AND MINERAL WATERS.

Thirty seven samples were analysed. 1 was found contaminated with copper and 11 contained nitrites.

COFFEE.

One sample was analysed and found to be adulterated with Bean starch.

SAMPLES FROM C. R. E. J.

One sample was analysed.

Coal	1.

SAMPLES FROM MUNICIPAL ENGINEER.

Fifty one samples were analysed as follows:—

Asphalt	20
Granite Filler	12
Granite Dust	1
Chlorinated Lime	1
Ore	1
Coal	16

SAMPLES FROM GAS ENGINEER.

Twenty one samples were analysed as follows:—

Spent Oxide	18
Coke	1
Coal	2

SAMPLES FROM ELECTRICAL ENGINEER.

Two hundred and seventy eight samples were analysed as follows:—

Lead Pipe	1
Kerosene Oil	2
Zinc Plates	2
Alloy	1
Coal	272

SAMPLES FROM WATER ENGINEER.

Two hundred and eighty two samples were analysed as follows:—

Lime	4
Sand	1
Gravel	3
Soil	1
Special waters	11
Coal	262

SAMPLES FROM HEALTH DEPARTMENT.

Two samples were analysed:—

Water (for Mosquito Department) . .	1
Aerated Waters	1

STAFF.

Mr. Harrington went on leave to England on 24th April and I was appointed to act for him during his absence. Shortly after arriving in England he announced his intention of resigning at the conclusion of his leave. Mr. R. E. Willgress, A.R.C.S., B.Sc., A.I.C. was appointed his successor, to commence duty on 1st January 1929, until which date I continued to act as Analyst.

Mr. Swee Lian Choo and Mr. Tan Hock Lim the Laboratory Assistants worked exceedingly hard during the year and it is only by their ungrudging labour given often on holidays and on Sundays that the work done could have been carried out.

I have the honour to be,

Sir,

Your obedient servant,

C. C. B. GILMOUR, M.A., M.B.,

Acting Municipal Analyst.

Singapore Municipality

Sixteenth Annual Report

of the

Municipal Bacteriological Laboratory

For the Year

1928

by

COLIN C. B. GILMOUR, M. A., M. B.

SINGAPORE.
Printed by C. A. RIBEIRO & Co., Ltd.
1929.

Bacteriological Laboratory,

Singapore, 6th March 1929.

THE MUNICIPAL HEALTH OFFICER.

Sir,

I have the honour to forward the following report on the working of this department during the year 1928.

I. PUBLIC HEALTH EXAMINATIONS.

During the year 8622 specimens were received for examination. This number is less than last year's by 2884 and the decrease is due to the decrease in the number of rats examined following on the stoppage of systematic trapping. If rats are excluded there is an increase of 855 in the specimens submitted.

MALARIA.

4038 blood films were examined in 1306 of which malaria parasites were found. The percentage positive was therefore 32.3 per cent, which is slightly less than last year. Of the positive films 430 were Subtertian, 873 Benign Tertian and 3 Quartan. 457 positive films came from the Johore Water Works, 11 from Mandai Quarry, 620 from the Health Department, and 218 from practitioners in town.

TUBERCULOSIS.

447 specimens of sputum, 11 of cerebro-spinal fluid, 4 of faeces and 6 of pus were examined. The My. tuberculosis was demonstrated in 107 specimens of sputum and in 1 of pus. Two specimens were inoculated into guinea pigs 1 of which developed Tuberculosis. The remaining specimens were negative.

TYPHOID AND PARATYPHOID FEVERS.

This group was responsible for 745 examinations. 49 specimens of serum gave a positive Widal Reaction with the B. typhosus and 18 with the B. paratyphosus A. and 6 with the B. paratyphosus B. 18 specimens of faeces, 1 of urine, 1 of blood, and 1 of well water were examined but no bacilli of the Enteric Group were isolated. No specimens from possible carriers were received, and this is a pity. It is said that Typhoid is increasing in Singapore and in the absence of badly infected water or demonstrable infection of food, cases can only be due to carriers. The water supply for years has been above suspicion and there have been no localized outbreaks casting suspicion on particular articles of diet so that it is probable that the sporadic cases occurring so often are due to carriers. In the case of Europeans at least, it ought to be possible to obtain specimens from their servants and others for examination as to the possibility of their being carriers. None have been received.

DYSENTERY.

Amoebic.—560 specimens were examined in 61 of which the E. histolytica or its cystic form was found.

Bacillary.—134 specimens were examined by culture and the B. dysenteriae (Shiga) isolated from 2 and B. dysenteriae (Hiss and Russell) from 13.

CHOLERA.

52 specimens were examined from 3 of which the specific vibrio was isolated.

PLAGUE.

18 specimens of human origin were examined in 5 of which the B. pestis was isolated in culture. The positive specimens came from the Middleton Hospital. One patient who made a good recovery, had many buboes and haemorrhagic bullae, from which the B. pestis was recovered in cluture. These bacilli were tested at the Medical School for virulence and found to be very virulent. Subcultures were sent to Java and to the Common-wealth of Australia Laboratories. On arrival their virulence was in a great measure diminished though when tested again later in the year here it was found as great as when first isolated.

Rats.—398 rats were dissected of which 2 were found to be infected with plague. Both were R. decumanus and were found in February. Systematic trapping of rats was not done and no flea counts were made. Such rats as were examined were brought in by Conservancy coolies, trapped by the Harbour Board, or sent in by private firms. It would be of some assistance to the Bacteriologist and to the Health Office generally if firms upon whose premises rats are trapped forwarded them to the Laboratory.

Cerebro Spinal Fever.—44 samples of cerebro spinal fluid were examined in 27 of which the Meningococcus was demonstrated and in 3 cases recovered in culture.

Diphtheria. 975 specimens were examined in 169 of which the C. diphtheriae was isolated in culture. In October, 73 throat swabs were examined from schools, of which 2 swabs were positive and in August 79 swabs were taken at a school of which 5 were positive. Diphtheria, as you have remarked in former reports, is increasing and of late has seemed to me to be increasing in virulence. At the Middleton Hospital of 43 cases admitted during the year 17 were laryngeal. Education with regard to the danger of this disease is needed. Often it is mistaken in the early stages by the parents for " cough " and an examination of throat swabs from young children with " cough " might be highly instructive. Similarly two very severe cases were thought by the parents, for several days to be due to " a cold in the head " and when at last medical assistance was sought, nasal diphtheria was found well established. The virulence of 4 cultures isolated was tested by inoculation (subcutaneously) in guinea pigs and two of the cultures were proved to be virulent.

Leprosy.—38 specimens were examined in 14 of which the My. leprae was demonstrated.

Miscellaneous included.—

51	specimens	of	urine for general examination.
19	,,	,,	urine for causative organisms.
20	,,	,,	pus for causative organisms.
2	,,	,,	fluid for causative organisms.
191	,,	,,	pus for gonococci (63 + ve).
7	,,	,,	urine for gonococci (1 + ve).
3	,,	,,	prostatic fluid for gonococci (1 + ve).
2	,,	,,	faeces for B. enteritidis (gaertner) –ve.
768	,,	,,	faeces for ova (39 Anky. 12 Ascaris).
6	,,	,,	faeces (dog) ova (4 Anky.)
3	,,	,,	(bullock) coccidia (— ve).
19	,,	,,	blood (various animals)—ve.
6	,,	,,	blood (Weil Felix Reaction) (3 + ve).
1	,,	,,	blood (differential count).
1	,,	,,	serum for sp. pallida—ve.
1	,,	,,	sputum for pneumococci (+ ve).
1	,,	,,	C. S. fluid for pneumococci (+ ve).
2	,,	,,	spermatic fluid for spermatozoa (2 + ve).
16	,,	,,	sewage.
9	,,	,,	soda water.
7	,,	,,	tumors.
2	,,	,,	tapeworms.
1	collection	of	32 fleas for determination (all P. irritans)
11	specimens	of	milk for Methyl Blue test.
2	,,		disinfectant.

The specimens of animal blood submitted varied in source from dogs to tigers. Of the urine specimens 1 was inoculated into a guinea pig to test for the presence of leptospira with negative results. The diagnosis of the fleas as P. irritans has been confirmed by the Entomologist at Kuala Lumpur. All the milk samples failed to retain the blue colour for more than 30 minutes and in 9 of them the colour was completely discharged in 20 minutes i.e. 9 were very poor and 2 poor, and none could be considered fair or good.

The samples of Soda Water were all of excellent quality save one. These samples were all submitted prior to licenses for the premises being renewed, by the Health Department.

Under miscellaneous must be mentioned work done in connection with Bacteriophage. This work was done under 3 heads viz. 1 maintenance of a dysentery bacteriophage received from Dr. Fletcher from d'Herelle (its discoverer) 2. Maintenance of a Cholera bacteriophage received from the Medical Research Institute Kuala Lumpur, 3. Experiments done to isolate bacteriophages from local sources.

1. This "phage" though maintaining its potency against the laboratory strains of B. dysenteriae (Flexner) and to a lesser degree against Hiss and Russell's bacillus had no lytic action against the laboratory strains of Shiga's bacillus. In December a strain of Shigas bacillus was isolated from a case of dysentery which was completely lysed by the "phage." One case of dysentery was treated by this "phage" with very satisfactory results.

2. The cholera bacteriophage has never proved very potent. At the best its power has never been above 8 on D'Herelle's Scale and secondary growths have been frequent. In view of the claims made for bacteriophage in the treatment of cholera the fact that the virulence could not be raised above 8 was disappointing. As there were very few cases of cholera during the year, I was unable to test the efficiency of this strain as a therapeutic agent.

3. Various samples of well water, some samples of Singapore River water, and numerous samples of faeces were examined for the presence of bacteriophages for the dysentery group of organisms and the enteric group. No evidence of the presence of bacteriophages was obtained except in the case of 1 sample of dysenteric faeces which contained a week bacteriophage for Flexners bacillus. It was at least encouraging to find that a dysentery phage could be isolated " de novo," even though its virulence was low and could not be raised.

II. WATER.

9155 samples of water were examined bacteriologically during the year of which 9059 were routine samples of Municipal water. During the year all the water supplied to the Public was both filtered and chlorinated. As in previous years the examinations carried out were (a) An estimation of the total number of colonies per c.c. growing on agar at 37° C. (b) An estimation of the smallest quantity of the sample in which lactose fermenters were present. (c) Isolation and study of the organisms in (b).

(a) TOTAL COUNTS.

The average number of colonies per c.c. was—

TABLE I.

Johore Main Water	730
Seletar Reservoir	400
Mc. Ritchie Reservoir	90
Pierce Reservoir	70
Bukit Timah Raw Water	160
Woodleigh Raw Water	100
Mount Emily Reservoir	120
Pearls Hill Reservoir	130
Laboratory Tap	110

Results are given to the nearest 10. The Seletar water has improved as have all the others except the tap water as tested by the laboratory tap. This was undoubtedly due to conditions affecting the mains supplying the office and surrounding area, for samples taken from other premises in the vicinity confirmed the results obtained from the laboratory tap. The phenomenon noted in previous years is again to be observed viz. the deterioration in quality of the water after leaving the reservoirs. The sampling of raw water at the filters is done at a different bed each day so that each delivery of raw water is sampled in rotation. This means that some times Samples have to be taken at what are virtually " dead ends " and it is possible that this may be the explanation. In addition to the counts detailed above, the water from each filter working every day was examined and also that from the streams supplying the reservoirs in rotation. No evidence of gross contamination of the streams in the catchment areas was obtained, though some intermittent contamination was found in Mc. Ritchie Reservoir.

(b) LACTOSE FERMENTERS.

The quality of the tap water was not kept at such a high standard as last year as judged by the samples taken from the laboratory tap. This was due, as mentioned above to some condition affecting the mains near the office and surrounding district, and may have been connected with the rise and fall of water in Pearls Hill Reservoir. I understand from the Water Engineer that the delivery from Woodleigh is practically constant, and that the variations in the quantity of water supplied, which may be as much as, from a rate of 30,000,000 gallons a day in the forenoon to 3,000,000 in the small hours of the morning, are met from Mc. Kenzie Road Pumping Station, partly pumping direct into the mains, and partly into Pearls Hill. The rise and fall of water in this reservoir is sometimes very great, and the mains supplying it may at one time bring water to it, and at another take water from it. In this way variations in bacterial content might occur. Undoubtedly too, the frequent flushing of mains near the office had a bad effect on the tap water. The poor results occurred from May to August, after which time improvement took place. Control samples taken from the Middleton Hospital, and samples received from other parts of the town were uniformly excellent, there being no lactose fermenters in 100 c.c.s. and the total count being under 50.

On several occasions anxiety was felt as to the working of some of the filters, the effluents from which were found on chemical examination to contain Nitrites. This occurred particularly at Woodleigh where aeration and liming were being carried on with a view to getting rid of the iron in the water. The bacteriological results were however consistently good, but until satisfied as to the freedom from contamination the amount of chlorine was temporarily increased. The appearance of Nitrites in these cases is due, not to fresh and unoxidized sewage contamination, but to interaction between the ammonia, lime, and the iron present in the water.

The following table summarises the results obtained under (b) from the chief points in the system during the year.

TABLE II.

SOURCE	LACTOSE FERMENTERS PRESENT IN					
	— 100 c.c.s.	+ 100 c.c.	+ 10 c.c.	+ 1 c.c.	+ 0.1 c.c.	+ 0.01 c.c.
Johore Main ..	11.4	88.6	76.2	41.1	18.4	2.7
Seletar ..	12.5	87.5	56.4	18.6	7.0	0.8
Pierce Reservoir ..	11.5	88.5	47.4	7.6	1.7	..
Mc. Ritchie Reservoir	21.2	78.8	61.0	12.5	2.1	..
Bukit Timah Filters ..	2.5	97.5	68.9	19.9	4.5	..
Woodleigh Filters ..	..	..	..	..	..	..
Mount Emily ..	14.8	85.2	43.6	11.4	2.1	..
Pearls Hill ..	28.3	71.7	27.5	3.3	0.4	..
Tap Laboratory ..	43.6	56.4	15.8	1.2	..	..

(C).

This work was directed, as in previous years, to ascertaining the presence of recent faecal contamination in the various parts of the supply if such contamination existed. Organisms of the susceptible class were found in the water from Kallang Conduit, the streams feeding Mc. Ritchie Reservoir and the water of that Reservoir, and, on one occasion, from Bukit Timah Filters, and from the newly constructed Fort Canning Reservoir shortly after water was first admitted to it and before the Reservoir was put into use. In each case the organism of the susceptible group was B. coli communis (Eserich). Altogether 280 colonies were worked out, and in addition to the fermentation reactions, the behaviour as regards growth in Sod. Citrate Medium, the Methyl Red, and Voges Proskauer reactions were observed and recorded.

The results were arranged according to the formula of Taylor and Martin, and the colonies also grouped under Mc. Conkeys four groups. These results are summarised below. Last year out of 275 colonies examined 10 belonged to Clemeshas class I and 94 gave formula, 1, while this year of 280 colonies examined, 11 belonged to Class 1 and 94 gave formula 1. The proportions of these colonies have kept fairly constant during the last two years.

TABLE III.

SOURCE	Total	CLASS				FORMULA						GROUP			
		I	II	III	IV	1	2	3	4	5	6	1	2	3	4
Johore Main	15	..	2	2	11	3	..	7	2	2	1	8	..	2	3
Seletar	10	..	4	3	3	3	4	..	3	..	..	2	..	5	..
Streams Pierce Res.	5	..	3	2	..	2	3	..	..	..	..	..	..	2	3
Pierce Reservoir	5	..	5	..	..	..	5	..	..	..	..	..	..	1	4
Kallang Conduit	10	2	3	3	2	5	2	1	..	2	..	4	2	1	3
Streams Mc. Ritchie	20	3	6	5	6	5	7	3	1	4	..	5	3	5	7
Mc. Ritchie Res.	30	2	9	16	3	18	4	4	..	4	..	16	4	4	6
B. T. Raw Water	25	..	17	..	8	1	10	5	1	8	..	6	..	9	10
B. T. Filters	70	2	23	24	21	25	11	20	3	11	..	33	2	13	17
B. T. C. W. T.	5	..	5	..	..	..	5	..	..	..	..	..	..	..	5
Woodleigh Filters	5	..	..	5	..	5	..	..	..	..	..	5	..	..	..
Pearls Hill	15	..	9	1	5	3	..	5	..	7	.	4	..	7	4
Fort Canning	5	2	..	2	1	4	..	..	..	1	..	2	2	..	1
Tap Water	60	..	25	22	13	20	9	21	5	5	..	28	..	..	32
TOTAL	280	11	111	85	73	94	60	66	15	44	1	111	13	49	95

Table IV shews the colonies which gave formula 1 i.e. the formula which is said to be evidence that the organism giving it is a "Truly faecal" organism. As in last years work it was found that the most common one is B. paragrunthal which has been established to be very resistant to the natural purifying agencies of sun, air, and time.

TABLE IV.

	CLASS 1		FORMULA 1 i.e. (— + —)								
SOURCE	B. Coli Communis	Others	B. Coli communis	B. paragrunthal	B. coscoroba	B. cloacae	B. No. 74	B. vekanda	B. acidi lactici	B. No. 71	unclassed
Johore Main ..	..	..	..	1	..	1	1	..	..	..	..
Seletar ..	..	..	..	2	1	..	..	..	..	..	..
Streams Pierce Reservior ..	..	..	..	2	..	..	..	..	..	..	..
Pierce Reservoir ..	..	..	..	..	..	..	..	..	..	..	..
Kallang Conduit ..	2	..	2	2	..	..	..	1	..	..	..
Streams Mc. Ritchie ..	3	..	..	5	..	..	..	..	..	..	..
Mc. Ritchie Reservior ..	2	..	2	15	1	..	..	..	..	..	..
Bukit Timah Raw Water ..	..	..	..	1	..	..	..	..	..	..	..
Bukit Timah Filters ..	2	..	2	13	..	1	..	..	3	4	2
B. Timah Clear Water Tank..	..	..	..	..	..	..	..	..	..	..	..
Woodleigh Filters ..	..	..	..	5	..	..	..	..	..	..	..
Pearls Hill ..	..	..	..	1	..	2	..	..	..	..	..
Fort Canning ..	2	..	2	2	..	..	..	..	..	..	..
Tap Water ..	..	..	..	18	2	..	..	..	..	..	..
Total ..	11	..	8	67	4	4	1	1	3	4	2

The conclusion from this part of the water analysis is that the use of the Sod. Citrate, Methyl Red and Vosges Proskauer Reactions condemns many colonies which are resistant and harmless and would result in the condemnation of water supplies as contaminated, which are perfectly safe.

MISCELLANEOUS WATERS.

Samples of the Chlorinated Water from Mandai Quarry were examined monthly and were all of excellent quality bacteriologically, as was to be expected, free Chlorine being present.

Samples from Pontian, Trengannu, T. Balei and various local firms were also examined.

III. SEWAGE.

The examinations of Sewage during the year have been (a) Microscopical study of the activated sludge from the Bioaeration Unit. (b) Tests of the Effluents for Stability by Methylene Blue. (c) A few examinations of sludge for the larvae of worms.

(a) Microscopic examination was carried out daily. The microscope reveals such active and varied forms of protozoal and other kinds of life that there is inevitably a tendency to think that it is the presence of this life that really makes the sludge "active," that the more numerous the protozoa and the more active their movements, the better the plant must be working. It is not possible to maintain that view at present nor is it possible to say that protozoa of any one genus are more useful than those of another. Often those one of type can be seen eating those of another.

During the year the plant cannot be said to have worked well and when it did give fairly good results, it was only for short periods, and when working well under the load which, at one time, it was hoped might be treated. It was noted during the year, that when the sludge deteriorated, the numbers of amoebae, particularly Arcella, increased, and small naked amoebae appeared while ciliates and particularly the free swimming forms decreased in numbers and almost disappeared. Increase in the numbers of colony forming ciliates (Carchesium and Ophrydium) was not always accompanied by a good effluent and in February seemed to be a direct result of a bad effluent, as an enormous growth on the boards in the effluent tank was found to consist entirely of Ophrydium and Rotifers. One action of protozoa that may be of importance is the churning caused by their constantly moving cilia. The currents produced by their movements through the fluid must also aid in thorough mixing. A striking feature of activated sludge is its relatively low bacterial count. This has been observed on every occasion on which a total count has been made during the year. The figures obtained have been from 80,000 to 90,000 in the sludge while those obtained from the effluents from the new filter beds have been from 360,000 to 400,000. This may be due to the action of protozoa in actually removing the bacteria by feeding on them (1).

In addition to the protozoa a great part of the activated sludge is seen to consist of fine and long bacterial threads closely or loosely interlaced and forming a network, in the meshes of which are entangled masses of amorphous matter and bacteria. When the effluent was poor and the sludge failed to settle quickly it was noted that the microscopic picture was composed almost entirely of these threads, with very little amorphous matter entangled. This suggested that the action might in some ways resemble that of a drifting filter and that the failure to settle might be caused by too little material being present.

Occasionally spirillae appeared and were always associated with poor working as are large numbers of Oscillaria and Sulphur bacteria.

(b) A few tests were done on the effluent with Methlylene Blue. The samples tested were taken from the Fall, Old beds, New beds and Bioaeration Effluent. The Fall samples were completely decolourized in 24 hours while all the rest retained the colour for more than 11 days i.e. their stability was 92 per cent while that of the final effluent at the Fall was 21 per cent.

(c) Samples of sundried Sludge, and of fresh Sludge from the Imhoff tanks, were examined for the presence of embryos of worms. The disposal of sludge is a serious problem for the Engineer and it would be helpful if it could be used as top dressing or manure. As the fresh sewage contains large numbers of Ascaris (Round worm) ova and also Ankylostome (Hook worm) ova, (hook worm ova have been found in the bioaeration unit while Ascaris ova are common there) the possibility of danger in using sludge is apparent. The samples were found to swarm with rhabditiform embryos many of which were Strongyloids and free living forms but some appeared to be Hookworm larvae. A technique has recently been described for rapidly separating the hookworm larvae in soil from the free living forms and the experiments will be continued.

The use of Sludge as filling too, is not entirely free from danger, for hookworm larvae have a considerable vertical range of movement which has been shewn to be dependent on the rise and fall of subsoil water. The presence of salt is harmful to them so that the high percentage of chlorides in our sewage may not be as great a disadvantage as it might at first appear.

IV. MORTUARY.

15 post mortem examinations were made during the year. The causes of death were:—

Cholera	2
Bubonic Plague	2
Beri Beri	3
Broncho pneumonia	2
Acute Gastro Enteritis	1
Bacillary Dysentery	1
Tuberculosis of lungs	2
Chronic Bronchitis	1
Suppurative Laryngitis	1

My thanks are due to my assistants Mr. Chin Chin Fong and Mr. Loo Cheng Swee for their good work and to Dr. Thurai for the assistance he has given in examining material, especially blood films, from his department. I also wish to put in record my indebtedness to Dr. Gautier of the League of Nations Epidemological Bureau for the great interest he has taken in the work of the department, and for obtaining information and assistance from workers in other parts of the tropics.

I have the honour to be,
Sir,
Your obedient servant,
C. C. B. GILMOUR, M.A., M.B.,
Municipal Bacteriologist.

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(1) Purdy W. C. "Activities of Plankton in the Natural Purification of Polluted Water" Amer. J. Pub. Health Vol. XVIII No. 4.

Middleton Hospital,

Singapore, 16th January, 1929.

To,

THE MUNICIPAL HEALTH OFFICER.

Sir,

I have the honour to present the annual report for the Middleton Hospital for the year 1928.

The following table gives a summary of the cases treated during the year:—

Disease	Remaining from 1927	Admitted	Discharged	Died	Remaining
Small-pox ..	1	8	8	1	..
Cholera ..	12	4	11	5	..
Plague ..	..	3	1	2	..
Chicken-pox ..	11	324	314	..	21
Measles ..	1	94	84	4	7
Diphtheria ..	1	42	39	4	..
Cerebro-Spinal Fever ..	1	13	4	9	1
Erysipelas ..	..	6	6	..	..
Whooping Cough	..	8	8	..	..
Mumps ..	3	48	50	..	1
Under Observation	..	45	45	..	..
German Measles ..	..	7	7	..	..
Scarlet Fever ..	..	3	2	1	..
Typhus ..	..	1	1	..	..
Tuberculosis ..	..	1	1	..	..
Other Diseases ..	..	63	52	11	..
Total ..	30	670	633	37	30

The total number treated was thus 700, which is the largest number on record. There were 37 deaths. Though the number of cases treated was large there was little serious infectious disease. The Hospital, originally intended for small-pox, cholera, and plague actually treated only 28 cases of these diseases during the year. The most common diseases were Chicken-pox, Measles, Mumps, and Diphtheria.

1. **Other Diseases:**—63 cases admitted as suffering from one of the notifiable infectious diseases were found to be actually suffering from:—Tonsillitis 2, Gumboil 1, Diarrhoea 8, Scabies 3, Pneumonia 3, Dermatitis 3, Dengue 3, Pneumococcal Meningitis 1, Cerebral Syphilis 1, Tubercular Meningitis 2, Bronchitis 2, No apparent disease 1, Phlebitis 1, Leprosy 1, Adenitis 2, Convulsions 1, Gonorrhoea 3, Ringworm 2, Dysentery 2, Yaws 1, Syphilis 3, Malaria 2, Abscess 1, Drug rash 1, Blackwater Fever 1, Ascariasis 1, Erythema 1, Cellulitis of neck 1, Influenza 7, Tuberculosis of lungs 2.

In this series there were 11 deaths viz: Cerebral Syphilis 1, Convulsions 1, Pneumonia 3, Tuberculosis of Lungs 1, Dysentery 1, Tubercular Meningitis 1, Cellulitis of neck 1, Blackwater Fever 1, Pneumococcal Meningitis 1.

The remainder were discharged or transferred to other Hospitals.

2. **Observation**:—45 contacts were kept in Hospital for 1 or more days.

Diphtheria:—42 cases were admitted and 1 remained from last year making 43 treated, of whom 4 died. 17 cases were of the laryngeal type 5 requiring tracheotomy of whom 3 died. 1 laryngeal case died upon whom tracheotomy was not done. In all the 4 fatal cases toxaemia was a most pronounced feature, and all gave a history of being ill for 6—8 days with difficulty in breathing for 2—3 days.

4. **Small-pox**:—8 cases were admitted and 1 remained from last year. 1 died and the remainder were discharged. 6 were of the discrete type and 2 were confluent. 5 of the discrete tpye had been vaccinated in infancy the remainder were unvaccinated. 1 case was traced direct to Hong Kong, 1 to Trengannu, 1 to Kelantan and 1 to Negapatam. The remainder apparently contracted the disease in Singapore.

The nationality of the cases was European 1, Chinese 1, Javanese 1, Indians 2, Malays 3.

5. **Chicken-pox**:—This accounted for nearly one half of the cases treated. 324 were admitted and 11 remained. Of those admitted 214 were adult Tamils mostly Municipal Coolies. Two small outbreaks occurred in Schools.

6. **Cerebro-Spinal Fever**:—13 cases were admitted and 1 remained of whom 4 were discharged, 9 died and 1 remained at the end of the year.

7. **Cholera**:—4 cases were admitted and 12 remained from the previous year. These 12 were cases from the small outbreak in the Lunatic Asylum. 5 died and 11 were discharged.

8. **Plague**:—3 cases were admitted of whom 1 recovered and was discharged and 2 died. The specific bacillus was isolated in each case in culture.

9. **Measles**:—94 cases were admitted and 1 remained from 1927, of which 4 died, 84 were discharged and 7 remained at the end of the year. In February H.M.T. "City of Marseilles" arrived with 5 cases of measles on board which were at once sent to this Hospital and a further 13 cases were admitted in the same month which could be traced to that ship. In December H.M.T. "Neuralia" arrived and sent 13 cases of Measles to the Hospital. Among these last cases one death occurred due to Marasmus.

10. **Typhus Fever**:— 1 case was sent in diagnosed as measles. The rash was not typical, there was violent and prolonged delirium with a positive Weil Felix reaction, and the case was accordingly diagnosed Typhus.

11. **Scarlet Fever**:—3 cases of this disease, rare in the tropics, were admitted, all from Steamers on the outward journey from Europe. 1 case died and two were discharged recovered.

The patients treated were by nationality:—

Europeans	65
Eurasians	48
Malays	35
Indians	364
Chinese	185
Japanese	3

The total number of days spent in hospital was 9491.

The following table shews the admission to Middleton Hospital during the past 10 years:—

Diseases.	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
Cholera ..	45	8	..	..	..	..	..	16	20	4
Small Pox ..	11	3	139	248	2	8	9	30	16	8
Plague ..	7	30	16	20	29	11	21	1	2	3
Chicken-pox ..	18	39	98	103	172	210	277	155	180	324
Diphtheria ..	2	15	20	13	18	17	32	25	16	42
Cerebro-Spinal Fever	14	27	57	29	6	13	7	6	14	13
Influenza ..	23	14	5	1	..	..	..	..	..	..
Measles ..	..	..	39	23	20	29	49	70	69	94
Erysipelas ..	..	..	9	3	8	5	2	11	3	6
Mumps ..	..	..	25	..	6	..	27	47	79	48
Whooping Cough ..	..	..	1	..	1	..	1	6	4	8
Typhoid Fever ..	..	..	1	..	1	..	1	3	1	..
Pulmonary Tuberculosis ..	..	..	5	4	2	..	1	1	..	1
German Measles ..	..	..	..	1	..	21	7	3	18	7
Scarlet Fever ..	..	..	..	1	..	..	..	1	..	3
Observation (contacts)	..	..	..	..	..	..	19	18	42	45
Typhus Fever ..	..	..	..	..	..	..	..	..	..	1
Other Diseases ..	55	46	61	58	15	41	17	32	52	63
Puerperal Fever ..	..	..	..	..	..	..	..	..	1	..
Total ..	175	182	476	504	282	361	473	425	517	670

The students from the Medical College attended the Hospital for clinical instruction in Infectious Diseases.

I have the honour to be,

Sir,

Yours Obedient servant,

C. C. B. GILMOUR, M.A., M.B.,

Medical Superintendent.

Municipal Health Office,
SINGAPORE,
25th February, 1929.

THE MUNICIPAL HEALTH OFFICER,
SINGAPORE.

SIR,

I have the honour to submit my ninth Annual Report in connection with the supervision of the Municipal Markets and the inspection of foodstuffs sold in them and in shops etc. within Municipal confines.

MUNICIPAL MARKETS.

(A) CLEANSING.

To facilitate cleansing stallholders were prohibited from placing any goods under or around their stalls. In addition every stall is dismantled completely once a month under the eye of the Market Keeper. This has resulted in fewer vermin and also in less commodities being exposed for sale at a time. As usual at Chinese New Year the Markets were completely emptied of all goods and the roofs etc. all hosed down. Below is a table of the number of vermin caught during this operation.

	Rats.	Mice.
Ellenborough Market	13	3
Kandang Kerbau Market	—	3
Other Markets	—	—

(B) REPAIRS.

Clyde Terrace Market. Two sliding gates repaired.

Ellenborough Market. Old auction shed demolished and a more roomy one erected.

Orchard Road Market. Two sliding gates repaired.

General repairs asked for were postponed owing to lack of funds.

(C) UNSOUND FOODSTUFFS.

80,250 catties of unsound foodstuffs were destroyed at the incinerators. 67 catties of measly pork were seized but no prosecutions ensued.

(D) PRICE AND QUANTITY OF FOODSTUFFS.

With the exception of wet fish which increased by about 800,000 catties the amount of foodstuffs offered was similar to last year. Total value however fell $400,000 so prices are evidently on the decline. The table below will give the trend of values during the past five years.

Below is a table of prices of staple articles of food showing the highest and lowest prices ruling for the year compared with 1914 and the last four years.

Article	Quantity per	8.8.14 average price	1924		1925		1926		1927		1928	
			Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest
		Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Beef ..	Kati	24–27	43	39	48	45	52	42	52	42	55	50
Mutton ..	,,	35	73	50	80	80	80	66	80	50	60	50
Pork ..	,,	38	66	60	68	60	68	60	67	60	68	52
Tea ..	,,	50	95	88	1.10	95	1.00	90	1.00	98	1.00	95
Coffee Bean ..	,,	36	48	45	65	48	70	40	70	40	68	45
Sugar ..	,,	07	17	12	13	08	12	09	12	09	10	08
Salt ..	,,	02	04	03	03	03	03	03	04	03	04	03
Potatoes ..	,,	8–05	14	09	12	10	12	10	14	09	12	09
Yams ..	,,	03	08	03½	08	04	08	04	12	04	08	05
Onions ..	,,	6–07	12	07	12	06	14	08	08	07	15	07
Geese ..	Each	$1.50–$2.10	..	..	..	..	..	..	..	..	..	..
Ducks ..	Dozen	$5.00–$7.00	11.40	7.80	15.00	8.40	14.40	9.96	15.60	10.80	12.00	8.40
Pigeons ..	Pair	75	1.20	1.00	1.30	80	1.40	85	1.40	90	1.40	90
Eggs (hens) ..	Dozen	30	54	50	72	35	65	43	90	60	62	48
Capons ..	Kati	42	78	68	85	70	90	70	1.00	75	1.10	72
Fowls ..	Each	40–70	60	46	2.10	70	3.00	1.50	2.50	1.80	2.40	1.30
Rice ..	Gantang	$6.50	63	50	56	52	60	54	57	59	50	40
		per picul	per gantang	per gantang	per gantang	per gantang	per gantang	per gantang	per gantang	per gantang	per gantang	per gantang

(E) REVENUE.

Below are tables shewing Revenue from all the Markets. As Rochore has been demolished and Maxwell Road, Grange Road and Geylang are in being, no comparison with previous years is shown. 5% Commission on wet fish sales is shown for the last 5 years.

Market.	Revenue.
Clyde Terrace	$164,713.64
Ellenborough	120,711.26
Telok Ayer	29,245.87
Orchard Road	14,313.00
Kandang Kerbau	19,417.00
Grange Road	1,895.00
Geylang Road	3,978.00
Peoples Park Hawker's Shelter	13,622.00
Maxwell Road	3,545.00
Total ..	$371,440.77

5% COMMISSION.

Market	1924	1925	1926	1927	1928
	$ *cts.*	$ *cts.*	$ *cts.*	$ *cts.*	$ *cts.*
Clyde Terrace ..	74,272 61	81,793 40	106,072 52	122,158 66	107,983 64
Ellenborough ..	64,245 23	66,911 43	76,598 76	77,826 82	75,703 26
Telok Ayer ..	3,038 92	2,841 99	2,971 21	2,769 47	2,330 87
TOTAL ..	141,556 76	151,546 82	185,642 49	202,754 95	186,017 77

(F) MARKET BYELAWS.

As reported last year, prosecutions were not urged for breaches of the byelaws, but 18 offenders were sent with their licences to the Deputy Health Officer who endorsed them with words to the effect that future breaches meant cancellation. This was very effective, no second offence being committed.

STAFF.

With the opening of Maxwell Market 9 more coolies were employed bringing staff up to seventy-seven. Fifty-three coolies reported sick at various times. Seven were sent to hospital while others were treated by the Department.

Market Keeper Olsen was sent to hospital in June and discharged cured in July.

Three Market Keepers were granted local leave varying from five days to one month.

I was granted casual leave to proceed to Bangkok in April.

GENERAL.

Grange Road Market. Although this market has been opened for a year now it is not patronised by Europeans as was hoped. A Cold Storage stall was put up but it is mostly the Hylam Cookies that purchase them. The Mems having to go in town in the mornings naturally purchase at Orchard Road where there is a larger assortment and by reason of competition from the shops opposite better prices obtain.

Maxwell Market. This building, a spacious one, at Junction of Maxwell and South Bridge Roads was completed during the year. Thousands of applications for stalls were received and filed in numerical order. Final selection was made by recommendation and the Market was opened on 17th November rent free for that month to allow stallholders to settle in. Anticipating that many only asked for stalls with a view to selling to others later on, each licence was endorsed in Chinese "No transfer will be allowed" and this was strictly adhered to. The consequence was that gradually the would-be vendors of plots gave up their stalls and very little business was done. Roadside hawkers were next given stalls with the double object of clearing streets and giving a fillip to business in the market. This did not have the desired effect as the hawkers preferred to go back on the roads where they pay no rent and there is no supervision. Result a fine market practically empty, the few stallholders who remain losing capital daily. Until we get power to confiscate and destroy the goods of hawkers in the adjacent streets I am afraid Maxwell market will be little used.

(1) A report on the amount of business done by eating stalls in the various markets was submitted on 27th November. Subsequently Eating stallholders is Orchard Road, Kandang Kerbau and Clyde Terrace Markets were given notice that their licences will not be renewed after 31st December, 1929.

(2) 2,376 visits were paid to the Markets during the year.

(3) Over 2,000 letters were received and dealt with.

SPECIAL.

On 17th May I was called to Clyde Terrace Market as a boycott of Japanese—caught fish was being instituted. You were at Johore (Gunong Pulai) and Deputy Health Officer on long leave so I got in touch with P. M. C. Meanwhile I had given all vacant slabs to the Japanese to sell direct to the public, also temporary stalls were placed wherever possible and the Japanese took out licences. This action was approved. All the same much good fish was spoilt and had to be dumped out at sea. Some of the rest was gutted, salted and sun dried by the Japanese and some was bought at night by Chinese from the Ship's side. After a week or so the Chinese saw that their action was really hurting themselves as the "dillah" fish which the Japanese catch in profusion by the Muro Ami method is eaten by the poor class Chinese and gradully the boycott died out.

A special report was sent you at the time and supplementary reports kept you in touch with the situation.

TOWN.

As the markets increase in number necessitating more visits and longer time on "rounds," town work suffers in proportion and reliance will have to be placed more on reports from the sanitary inspectors in their respective districts.

29,698 items of various kinds of unsound foodstuffs were, however, collected and sent to the incinerators.

Attached will be found the usual tables relating to my duties.

I have the honour to be,
Sir,
Your obedient servant,
M. N. MACMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

RETURN OF SOME OF THE FOODSTUFFS PASSING THROUGH MARKETS DURING THE YEAR 1928.

MARKET	Wetfish ctts.	Boiled fish ctts.	Shell fish ctts.	Beef ctts.	Mutton ctts.	Pork ctts.	Fowls	Capons	Geese	Ducks	Pigeons	Turkeys	Bean cakes ctts.	Bean sprouts ctts.	Approximate Value.	
							HEADS								$	cts.
Clyde Terrace ..	10,290,255	35,394	7,170	385,920	183,560	319,139	31,080	...	1,576	26,146	14,112	...	309,833	21,286	2,790,405	92
Ellenborough ..	5,385,778	42,068	348,261	22,203	...	866,163	85,440	3,473	2,021	117,089	...	...	146,701	98,394	2,380,576	44
Telok Ayer ..	128,507	...	80,140	40,769	91,646	224,679	77,188	...	690	23,800	9,325	392	...	...	392,484	62
Kandang Kerbau	878,041	37,556	23,007	102,597	100,256	588,749	63,911	334	...	14,468	...	...	36,384	39,441	808,352	81
Orchard Road ..	443,037	37,318	...	199,581	40,782	291,297	49,097	162	38	5,011	6,262	9	37,214	39,213	511,400	96
Rochore ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
TOTAL ..	17,125,618	152,336	458,988	751,070	416,244	2,290,027	306,716	3,969	4,325	186,514	29,799	401	530,132	198,334	$6,883,220	75

M. N. MACMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

UNSOUND FOODSTUFFS DESTROYED DURING THE YEAR 1928.

MARKET	Wetfish ctts.	Saltfish ctts.	Beef ctts.	Mutton ctts.	Pork ctts.	Vegetables ctts.	Fruits ctts.	TINNED GOODS		Bottles preserves No.	Eggs No.	Miscella-neous	TOTAL ITEMS
								Cases	Tins				
Clyde Terrace ..	8,500	110	330	...	34	6,353	2,340	...	...	...	1,316	696	...
Ellenborough ..	4,079	162	...	...	216	7,959	...	...	...	...	86	5,044	...
Telok Ayer ..	30	...	...	...	1	11,403	5,190	...	...	...	229	3	...
Kandang Kerbau ..	213	30	6	5	168	8,561	2,068	...	...	...	1,621	339	...
Orchard Road ..	98	2	...	4	25	5,139	4,822	...	...	...	10	15	...
Other Markets ..	362	81	...	...	137	2,061	...	...	...	...	306	96	...
	13,282	385	336	9	581	41,476	14,420	...	...	...	3,568	6,193	80,250
TOWN ..	...	...	...	...	69	...	...	1,582	15,003	611	...	12,433	29,698
TOTAL ..	13,282	385	336	9	650	41,476	14,420	1,582	15,003	611	3,568	18,626	109,948

M. N. MACMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

MARKETS.

Return of Prosecutions for the year 1928.

MARKETS.	Prosecutions.	Convictions.	Postponed.	Withdrawn.	Warrants.	Total Fines.
						$ cts.
Clyde Terrace ..	..	..	..	..	..	..
M. O. 192 ..	..	..	..	..	..	..
Market Bye-laws ..	..	..	..	..	..	..
Ellenborough ..	..	..	..	..	..	..
M. O. 192 ..	..	..	..	..	..	..
Market Bye-laws ..	1	1	..	..	..	3 00
Telok Ayer ..	..	..	..	..	..	..
M. O. 192 ..	..	..	..	..	..	..
Market Bye-laws ..	..	..	..	..	..	..
Kandang Kerbau ..	..	..	..	..	..	..
M. O. 192 ..	..	..	..	..	..	..
Market Bye-laws ..	..	..	..	..	..	..
Orchard Road ..	..	..	..	..	..	..
M. O. 192 ..	..	..	..	..	..	..
Market Bye-laws ..	..	..	..	..	..	..
Rochore ..	..	..	..	..	..	..
M. O. 192 ..	..	..	..	..	..	..
Market Bye-laws ..	..	..	..	..	..	..
Peoples Park Hawker Shelter ..	..	..	..	..	..	..
M. O. 192 ..	..	..	..	..	..	..
Market Bye-laws ..	..	..	..	..	..	..
Town ..	..	..	..	..	..	..
M. O. 192 ..	..	..	..	..	..	..
M. O. 186	..	..	..	..	..	..
Grand Total ..	1	1	..	..	..	$3 00

M. N. MACMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

LICENSE RETURN DECEMBER, 1928.

Summary of Licenses Issued.

FEE	$30	$15	$15	$12	$15	$10	$6	$15	$10	$5	$15	$30	$5	$5	$10	$7	$5	TOTAL No.	TOTAL	
MARKET	Dry goods	Beef	Salted Vege-tables	Mutton	Pork	Curry stuff	Bean cakes	Poultry	Vege-tables and fruit	Eggs	Money Changer and Cigar:	Eating	Fish	Shell Fish and Tripang	HAWKERS			Licenses Issued	Collected $	cts.
Clyde Terrace	54	24	4	6	12	4	3	16	75	6	6	15	147	...	2	...	...	347	4,665	00
Ellenborough	32	1	4	...	22	1	4	18	62	8	2	14	103	12	39	...	...	322	3,744	00
Telok Ayer	8	3	4	4	6	1	...	6	72	1	...	16	32	1	9	21	...	184	2,190	00
Orchard Road	6	5	1	3	8	1	3	6	38	...	1	2	22	...	7	...	...	103	1,179	00
Kandang Kerbau ..	7	6	1	7	15	3	2	4	57	...	1	3	36	...	3	...	...	145	1,611	00
Maxwell	...	9	4	1	19	2	3	10	63	6	2	...	61	...	1	...	...	181	1,685	00
																			$15,074	00

SUMMARY OF VACANT STALLS END OF DECEMBER, 1928.

																		Total Vacant
Clyde Terrace	...	...	...	2	...	...	...	8	5	...	1	...	19	...	6	...	...	41
Ellenborough	...	...	...	...	...	...	...	10	9	...	...	...	5	...	1	...	...	25
Telok Ayer	7	...	...	...	4	1	1	2	16	...	...	3	3	...	...	...	...	37
Orchard Road	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Kandang Kerbau ..	4	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
Maxwell	...	5	...	3	15	...	1	10	15	...	...	...	3	...	...	...	...	52
																		161

M. N. MacMAHON,
Cert. R. San. Inst.,
Food and Market Inspector.

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases for the year 1928.

Date	Name	Address	By whom Arrested	Offence	By whom Tried	Results	Remarks
22/2/28	Surjoo Singh . .	78, Dunlop Street . .	Accompanied Insp: Hoeden to Police Station	Selling milk without a licence	Magste. Gourley	Dismissed	
,,	Tharapatt . .	114, Syed Alwee Road . .	do.	Do.	,, ,,	,,	
,,	Surjart Singh . .	16, Syed Alwee Road . .	do.	Do.	,, ,,	,,	
23/2/28	Poham Singh . .	66, MacPherson Road . .	P. C. 1307	Do.	Magste. Dakers	Fined $ 10.00	
,,	Killaney Missi . .	80, Dunlop Street . .	,, 928	Do.	,, ,,	,, 10.00	
,,	Kedarnan . .	79, Dunlop Street . .	,, ,,	Do.	,, ,,	,, 10.00	
,,	Ramroot Singh . .	78, Dunlop Street . .	,, ,,	Do.	,, ,,	,, 10.00	
,,	Ramatdari . .	16-1, Prinsep Street . .	,, ,,	Do.	,, ,,	,, 10.00	
,,	Marimuthu . .	Nil, Havelock Road . .	,, ,,	Do.	,, ,,	,, 10.00	
,,	Safragh Singh . .	70, Dunlop Street . .	,, ,,	Do.	,, ,,	,, 10.00	
28/2/28	Sakarappani . .	87, South Bridge Road	Accompanied Insp: C. A. de Souza	Failing to report on the 10th day when under surveillance	,, ,,	,, 5.00	
					Carried forward	$75.00	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases for the year 1928—*(contd.)*

Date	Name	Address	By whom Arrested	Offence	By whom Tried	Results	Remarks
					Brought forward	$75.00	
22/2/28	Vanjoo ..	——	P. C. 499	Selling milk without a licence	2nd Magste.	Discharged	
,,	Subdah Singh ..	77, Syed Alwee Road ..	,, 1307	Do.	3rd ,,	Cautioned and discharged	Licence renewed
,,	Sahib Jane ..	Cross Street ..	,, 116	Failing to carry out an undertaking to report himself daily at the Municipal Health Office	,, ,,	Fined $ 5.00	
26/4/28	Sabras Singh ..	78, Dunlop Street ..	,, 731	Selling milk without a licence	,, ,,	,, 10.00	
,,	Ram Rut ..	406, Changi Road ..	,, ,,	Do.	,, ,,	,, 10.00	
,,	Nasee Singh ..	80, Dunlop Street ..	,, 1061	Do.	,, ,,	,, 10.00	
30/7/28	Baljoo Singh ..	188, Serangoon Road ..	,, 944	Do.	Magste. Finlay	,, 5.00	
,,	Kalimuthu ..	185, Upper Serangoon Rd.	,, ,,	Do.	,, ,,	,, 0.50	Delivering milk for another licenced milk seller
,,	Sarjoo Singh ..	78, Dunlop Street ..	,, ,,	Do.	,, ,,	,, 5.00	
					Carried forward	$120.50	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases for the year 1928—*(contd.)*

Date	Name	Address	By whom Arrested	Offence	By whom Tried	Results	Remarks
					Brought forward	$120.50	
30/7/28	Ramsamur Singh	75, Dunlop Street ..	Insp: Hogan	Selling milk without a licence	4th Magste.	Fined 20.00	
,,	Koomal Singh ..	79, Serangoon Road ..	,, Conceicao	Do.	,, ,,	,, 20.00	
,,	Jadoo Guala ..	64, MacPherson Road ..	,, ,,	Do.	,, ,,	,, 20.00	
,,	Sarjoo ..	42, Dunlop Street ..	,, Maniam	Do.	,, ,,	,, 20.00	
,,	Rampat Singh ..	Dunlop Street ..	,, ,,	Do.	,, ,,	,, 20.00	
,,	Beesarat Singh	Jail ..	,, Hogan	Do.	,, ,,	,, 20.00	
,,	Bola Ram ..	79, Dunlop Street ..	,, Maniam	Do.	,, ,,	,, 20.00	
,,	Kali Mootoo ..	185, Serangoon Road ..	,, Mathieu	Do.	,, ,,	,, 0.50	Delivering for licensed milk seller No. 105
,,	Baljoo Singh ..	188, Serangoon Road ..	,, ,,	Do.	,, ,,	,, 5.00	Employee
,,	Surjoo Singh ..	78, Dunlop Street ..	,, ,,	Do.	,, ,,	,, 5.00	Employee
					Carried forward	$271.00	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases for the year 1928—*(contd.)*

Date	Name	Address	By whom Arrested	Offence	By whom Tried	Results	Remarks
					Brought forward	$271.00	
30/7/28	Kitari Singh ..	79, Dunlop Street ..	Insp: Maniam	Selling milk without a licence	4th Magste.	Fined 20.00	
31/7/28	Rajah Gopal ..	Silat Road ..	,, C. A de Souza	Do.	,, ,,	,, 1.00	Employee of licensed milk seller No. 152
,,	Aviapam ..	36, Beo Lane ..	,, Hogan	Do.	,, ,,	Withdrawn	Fee paid
,,	Basdeo Singh ..	118, Syed Alwee Road ..	,, ,,	Do.	,, ,,	Fined $20.00	
,,	Harikal ..	Kampong Saigon ..	,, ,,	Do.	,, ,,	,, 20.00	
,,	Surabjee Singh	Dunlop Street ..	,, C. A. de Souza	Do.	,, ,,	,, 20.00	
,,	Rambit ..	Tanjong Pagar ..	,, Maniam	Do.	,, ,,	,, 20.00	
,,	Mahadeo Singh	80, Dunlop Street ..	,, ,,	Do.	,, ,,	,, 20.00	
,,	Parakaum ..	22, Pasir Panjang ..	,, Hogan	Do.	,, ,,	,, 10.00	
					Carried forward	$402.00	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases for the year 1928—*(contd.)*

Date	Name	Address	By whom Arrested	Offence	By whom Tried	Results	Remarks
					Brought forward	$402.00	
2/8/28	Sookooroo . .	Joo Chiat Road . .	P. C. 916	Selling milk without a licence	3rd Magste.	Fined 15.00	
,,	Lalbahardoe Singh . .	Joo Chiat Road . .	,, ,,	Do.	,, ,,	,, 15.00	
,,	Serathan Singh	Geylang Serai . .	,, 720	Do.	,, ,,	,, 15.00	
,,	Matora . .	281, Upper Serangoon Rd.	,, 609	Do.	,, ,,	,, 15.00	
,,	Jagarnath Singh	Syed Alwee Road . .	L/C. 500 and P. C. 851	Do.	,, ,,	,, 15.00	
,,	Fakiri Chowdhari	177, Syed Alwee Road . .	,, ,,	Do.	,, ,,	,, 10.00	
,,	Ramlenkesh . .	48, MacPherson Road . .	,, ,,	Do.	,, ,,	,, 8.00	
,,	Jangir Singh . .	Kandang Kerbau . .	,, ,,	Do.	,, ,,	,, 15.00	
,,	Markanda Singh	148, Syed Alwee Road . .	,, ,,	Do.	,, ,,	,, 15.00	
,,	Sofia Singh alias Safara Singh	Kampong Kapor . .	P. C. 286	Do.	,, ,,	,, 15.00	
					Carried forward	$540.00	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases for the year 1928—*(contd.)*

Date	Name	Address	By whom Arrested	Offence	By whom Tried	Results	Remarks
					Brought forward	$540.00	
18/9/28	Chee See Choon	9, S.H.B. Coolie Lines ..	P. C. 841	(1) Failing to have his child vaccinated ..	3rd Magste.	Fined 4.50	
				(2) Failing to appear in Court in answer to a summon ..	„ „	„ 7.00	
28/9/28	Wong Ah Keow	Nil X 75, Kallang Road	Insp: Perry	Unlicensed coffee stall (Daily fine) ..	„ „	„ 95.00	
29/11/28	Yong Chee Kwan	Nil opp; 135, Lavender Street ..	P. C. 1167	Do. ..	„ „	„ 125.00 24.00	
31/7/28	Merguan ..	105, Pasir Panjang ..	Insp: Hogan	Selling milk without a licence	4th Magste.	„ 10.00	
„	Mootoo Mydin ..	100, Pasir Panjang ..	„ „	Do.	„ „	„ 10.00	
					Carried forward	$815.50	

H. J. BENJAFIELD,

Chief Sanitary Inspector.

RETURN OF LICENSES (OFFENSIVE TRADES) ISSUED DURING

Roller Summary 1928.

Nature of License.		Number issued.	Amount $	cts.	REMARKS.
Blachan Store	..	10	240	..	
Brick Kiln	..	..	..	..	
Dye House	..	8	96	..	
Drying and Sorting Fish	..	5	60	..	
Fish Curing	..	..	..	..	
Fruit Preserving	..	6	300	..	
Knacker's Yard	..	1	12	..	
Lime Making	..	..	..	..	
Lye Making	..	..	..	..	
Laundry	..	325	324	25	1 at 3 months fee
Offal Boiling	..	..	..	..	
Pottery Works	..	..	..	..	
Private Market	..	1	1	..	
Rags and Bones Store	..	3	12	..	
Sago Factory	..	4	179	16	1 at 7 months fee
Sheep or Goat Pens	..	3	30	..	1 at 6 months fee
Sugar Boiling	..	9	450	..	
Soap Boiling	..	11	120	..	2 at 6 months fee
Tannery	..	10	500	..	
Cowsheds	..	9	245	..	
Cattle Sheds	..	29	747	50	2 at 6 months and 1 at 3 months.
Pony Stables	..	16	150	..	
Piggery	..	..	..	..	
Total	..	450	3,466	91	

H. J. BENJAFIELD,
Chief Sanitary Inspector.

RETURN OF NOTICES SERVED AND COMPLIED WITH ETC. DURING THE YEAR, 1928.

Nature of Notice.	Brought forward from last year.	Served during the year.	Total.	Complied with during the year.	Carried forward to next year.	REMARKS.
Nuisance	124	142	266	185	81	
Intimation	338	489	827	564	263	
Limewash	38	3,524	3,562	3,202	360	
Latrine	46	13	59	58	1	
Drain	1	..	1	1	..	
Well	8	28	36	20	16	
Abatement Order	1	9	10	8	2	
Mandatory Order	3	4	7	6	1	
Closing Order	..	36	36	7	29	
Dest: of Mosquitos	434	565	999	521	478	
A. H. O's notices renewal of licenses 1929	..	51	51	12	39	
Total ..	993	4,861	5,854	4,584	1,270	

H. J. BENJAFIELD,

Chief Sanitary Inspector.

HEALTH DEPARTMENT.

Return of Prosecutions for Year, 1928.

OFFENCES.		Division A. (South) Districts 1 to 8.				Division B. (North) Districts 9 to 16.			
		TOTAL				TOTAL			
		Prosecutions	Withdrawn	Convictions	FINES $	Prosecutions	Withdrawn	Convictions	FINES $
Municipal Ordinance 135.									
Filthy premises	Section 226	71	3	68	932.00	53	2	51	460.00
Allowing premises to be overcrowded ..	,, 230	3	..	3	19.00	..	..	..	..
Non-compliance with Nuisance Notice ..	,, 239	49	26	23	106.00	37	22	15	46.00
,, ,, ,, Order ..	,, 240	5	..	5	16.50	13	1	12	110.00
,, ,, Well Notice ..	,, 247	7	1	6	9.50	1	1	..	..
Opening Well without permission	,, 247	..	..	..	..	..	..	..	..
Limewash notice not complied with ..	,, 227	..	..	..	..	..	..	..	..
Latrine etc. notice not complied with ..	,, 212	2	1	1	4.50	2	..	2	9.00
Using nightsoil/or urine as manure ..	,, 206	15	1	14	44.00	28	1	27	256.50
Nightsoil kept for more than 48 hours ..	,, 216	1	..	1	4.50	..	..	..	..
Offensive matter flowing into Public Drain ..	,, 127	..	..	..	..	..	..	..	..
Unlicensed Offensive Trades ..	,, 204	45	8	37	451.50	60	10	50	277.00
Carried forward ..		198	40	158	1,587.50	194	37	157	1,158.50

HEALTH DEPARTMENT.

Return of Prosecutions for Year, 1928.—*(Contd.)*

OFFENCES.	Division A. (South) Districts 1 to 8.				Division B. (North) Districts 9 to 16.			
	TOTAL				TOTAL			
	Prosecutions	Withdrawn	Convictions	FINES $	Prosecutions	Withdrawn	Convictions	FINES $
Brought forward ..	198	40	158	1,587.50	194	37	157	1,158.50
License not exhibited .. .. „ 371	..	..	..	..	..	..	..	..
Obstructions .. .. „ 116	..	..	..	..	..	..	..	..
Bye-laws—Sections 57 and 204 M. O. 135.								
Unlicensed Foodshops	228	48	180	1,072.50	193	55	138	884.00
„ Milk Vendors	36	1	35	381.00	11	..	11	153.00
Recovery of Daily fines	149	79	70	1,855.00	78	17	61	2,098.50
Employing women without permission of H. O. ..	..	..	..	..	..	..	..	..
Breaches of the Piggery Bye-laws	1	..	1	5.00	..	..	..	..
Unlicensed Piggeries	178	29	149	405.00	175	43	132	313.50
Filthy Stables, Cowsheds etc.	..	..	..	..	..	..	..	..
Breaches of the Foodshop Bye-laws	57	2	55	532.00	22	3	19	130.00
Carried forward ..	847	199	648	5,838.00	673	155	518	4,737.50

HEALTH DEPARTMENT.

Return of Prosecutions for Year, 1928.—*(Contd.)*

OFFENCES.	Division A. (South) Districts 1 to 8.				Division B. (North) Districts 9 to 16.			
	TOTAL				TOTAL			
	Prosecutions	Withdrawn	Convictions	FINES $	Prosecutions	Withdrawn	Convictions	FINES $
Brought forward ..	847	199	648	5,838.00	673	155	518	4,737.50
Markets and Slaughter Houses.								
Unsound Food .. .. .. Section 192	2	..	2	60.00	..	..	..	..
Slaughtering Animals excepts in Abattoirs	..	..	..	..	..	..	..	..
Selling vegetables within 50 yards of market ..	..	..	..	..	..	..	..	..
Market Bye-laws	1	..	1	3.00	..	..	..	..
Hawkers—Section 187 and 188 and Bye-Laws made there-under.								
Stalls in unspecified Streets .. .. Section 187	..	..	..	..	..	..	..	..
Unlicensed Hawkers	..	..	..	..	..	..	..	..
Hawkers Bye-laws	..	..	..	..	..	..	..	..
Sale of Food and Drugs Ordinance No. 139.								
Selling Adulterated Milk .. ..Section 11–1	2	..	2	50.00	6	1	5	234.50
Carried forward ..	852	199	653	5,951.00	679	156	523	4,972.00

HEALTH DEPARTMENT.

Return of Prosecutions for Year, 1928.—*(Contd.)*

OFFENCES.	Division A. (South) Districts 1 to 8.				Division B. (North) Districts 9 to 16.			
	TOTAL				TOTAL			
	Prosecutions	Withdrawn	Convictions	FINES $	Prosecutions	Withdrawn	Convictions	FINES $
Brought forward ..	852	199	653	5,951.00	679	156	523	4,972.00
Selling Milk deficient in fat .. .. Section 11–1	1	..	1	25.00	..	..	..	..
Q. and P. of Disease Ordinance No. 157.								
Failing to report case of Inf. Disease .. Section 3	..	..	..	..	..	..	..	..
Moving patient without permission .. ,, 15	..	..	..	..	..	..	..	..
Exposing patient while suffering .. .. ,, 15	..	..	..	..	..	..	..	..
Conveying patient in public vehicle .. ,, 19	..	..	..	..	..	..	..	..
Failing to have child vaccinated .. .. ,, 31	87	14	73	231.50	43	6	37	64.50
,, ,, bring child for inspection .. ,, 32	..	..	..	..	..	..	..	..
Registration Births and Deaths Ordinance No. 59.								
Failing to Register Births .. .. Section 11	16	1	15	17.50	8	..	8	12.50
,, ,, ,, Deaths .. .. ,, 11–1	..	..	..	..	..	..	..	..
Carried forward ..	956	214	742	6,225.00	730	162	568	5,049.00

Return of Prosecutions for Year, 1928.—*(Contd.)*

OFFENCES.	Division A. (South) Districts 1 to 8.				Division B. (North) Districts 9 to 16.			
	TOTAL				TOTAL			
	Prosecutions	Withdrawn	Convictions	FINES $	Prosecutions	Withdrawn	Convictions	FINES $
Brought forward ..	956	214	742	6,225.00	730	162	568	5,049.00
Destruction of Mosquitos Ordinance No. 174.								
Failing to comply with notice .. .. Section 1–8	11	4	7	53.50	6	2	4	27.50
Recovery of costs of work done .. .. „ 7–1	..	..	..	..	..	..	..	..
Breaches of Section 229	19	14	5	33.00	8	7	1	..
Breaches of Section 210	1	..	1	5.00	..	..	..	..
Failing to appear in court	1	..	1	7.00	..	..	..	..
Illegal slaughtering Section 198	..	..	..	..	1	..	1	25.00
Total ..	988	232	756	$6,323.50	745	171	574	$5,101.50

Summary.

Total Inspections	45,676
„ Prosecutions	1,733
„ Withdrawn	403
„ Convictions	1,330
„ Fines	$11,425

H. J. BENJAFIELD,
Chief Sanitary Inspector.

N.B.—Costs are not included in the amount of fines.